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The
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VOLUME XXXII JUNE 1920 NUMBER 6

Economy in Schoolhouse Planning

By W. R. McCORNACK, ARCHITECT, BOARD OF EDUCATION, CLEVELAND, OHIO

THE excessive cost of construction to-day should lead all architects to consider fundamental principles of plan because any element of waste area adds a burden of cost that to-day cannot be justified. In this paper, which was read before the National Education Association at a recent meeting of that body, Mr. McCornack points out some tangible results of saving in cost where the question of plan receives careful consideration. It is particularly addressed to school authorities but its value to architects is not of lesser consequence, for their function to-day should be to lead in meeting the difficulties with which all construction is beset. — EDITORS.

A PROMINENT state official recently made public a statement that millions of dollars are being wasted in the state of Ohio in costly façades to school buildings. Unfortunately, this reflects an erroneous but often popular opinion, the facts being that in the most ornate public school buildings all the stone work, including base courses, steps, window sills, belt courses, coping and ornamental work, does not exceed 4 per cent of the total cost of the building and the ornamental stone work not more than 1 per cent. For the æsthetic welfare of any community this small expenditure can and should be defended.

It is a fact that there is a greater percentage of poorly designed and poorly built schools in this country than any other type of building, except some of the very cheapest commercial forms.

It is also a fact that only a very small percentage of the architects who have attained a commanding position in the profession, due to careful training and experience, plan and build schools.

Why is this true?

It is true too often because school authorities listen to architects who present their cases on the basis of cheap commissions, and because they claim they can build school buildings for less money than their competitors, and also because the architect and educator fail to co-operate.

When the knowledge becomes common that a school is to be erected in a community, not only are well qualified architects considered but less qualified of the profession present their cases, the latter agreeing to do the work for 3 or 4 per cent, when it is a well-known fact that no architect can provide thorough study and good service for any such price. Yet many of the school authorities will be influenced by this argument.

Any architect who agrees to do work for less than the recognized rate of compensation, and who guarantees to build for a certain price or forego his commission, is ignorant of the service he should render his client, or he is dishonest, or he is both. How can an architect guarantee a price when he has no drawings before him, when contractors estimating from completed drawings vary so much in their estimates?

You buy clothing or any other material and expect to pay the merchant 15 per cent or 20 per cent or 25 per cent profit. Without question you allow the contractor 10 per cent or 15 per cent profit with his overhead, but the architect is supposed to provide more service and assume more responsibility than the contractor, and the architect's smaller fee must include his overhead and what profit he can make, and generally the low commission architect slights his work to squeeze out his profit.

Not until we appreciate architectural service on a higher plane with higher fees, and make the architect financially responsible for all the errors in his plans, will school authorities secure service which means the elimination of waste in schools, better buildings which means minimum architectural maintenance cost in the future, and structures of such quality that they will be an asset to the community.

We talk more of standards and standardization than we do of the great, broad problems of planning and construction. Standardization is an ex-

cellent thing, but it can lead us into dangerous bypaths, as in this instance.

In the Cleveland school system for years a certain desk was standardized. This desk required a room 25 feet wide and 32 feet long to seat forty-two desks of a given size. By redesigning the furniture it was found possible to place the same number of desks in a room 24 feet wide and 28 feet long, thus bringing about a saving of 3,000 cubic feet per room, which at a per cubic foot cost of 20 cents means a saving of $600 per room, or more than double the cost of furniture. In a thirty-room building this means a saving of $18,000. This amount at compound interest for fifty years, or the life of a building, amounts to $20,000 per room, or $600,000 for a thirty-room building — enough to meet the cost of constructing the building.

What seem to be very minor matters in planning are full of danger and financial calamity to groups of school authorities continuing to pursue a policy of careless planning, and indict any architect or school man continuing to disregard the study of the problem of saving space. On the other hand, this reduction in class-room area does not show to advantage when comparing class-room areas with corridor areas, and we must be alive to these facts in our studies of standardization and comparative areas.

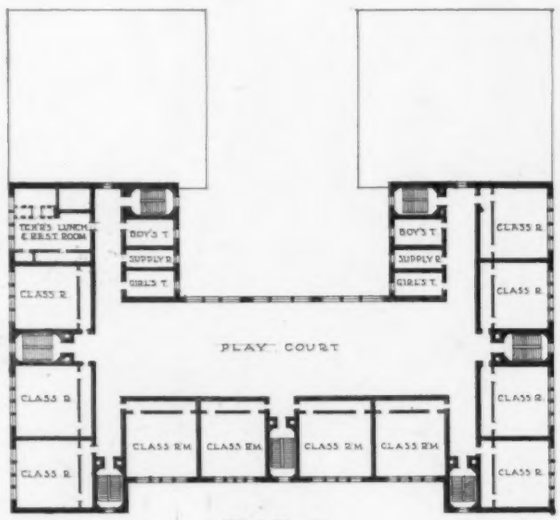
But there is a much more serious problem in the matter of waste space, which has gone unchalienged for decades. It has caused such an alarming waste of money in this country that remedies must be found without further delay before millions of dollars more are thrown away.

This has to do with waste due to stairs and corridors. There are 1,250,000 square feet of floor space in the school buildings of Cleveland devoted to stairs and corridors. This is an area equivalent to 1,560 class rooms, or enough to accommodate 62,400 children, and at the present cost of building in the city of Cleveland it would require $35,000,000 to construct this number of rooms.

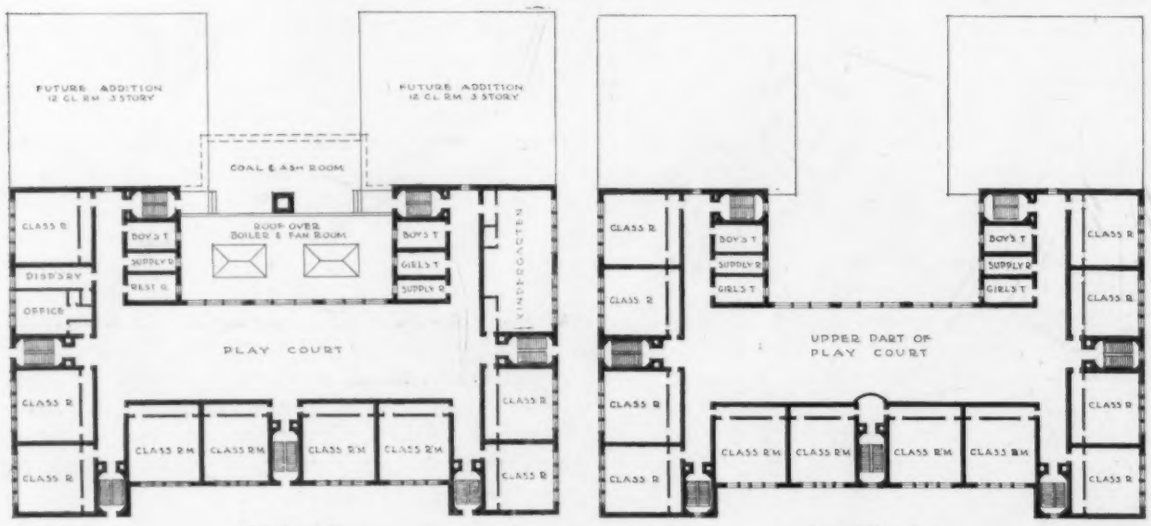
Considering that Cleveland is equal to one one-hundred and twentieth of the population of the country, the space devoted to stairs and corridors in the entire country is equal to 187,-200 class rooms, or seating capacity for 7,480,000 children, and the replacement cost would be about $3,744,-000,000.

Cleveland has been studying the question of elimination of waste space with the result that three types of plans have been developed.

These types are:



Third Floor Plan



First Floor Plan — Second Floor Plan

Three-Story Corridorless Elementary School with Unit System of Plan and Unit System of Stairs
W. R. McCornack, Architect

1. One-story corridorless elementary school—10 per cent of the floor area in corridors.

2. Three-story corridorless elementary school—12 per cent of the floor area in stairs and corridors.

3. Junior High School combination one- and three-story building—15 per cent of the floor area in stairs and corridors.

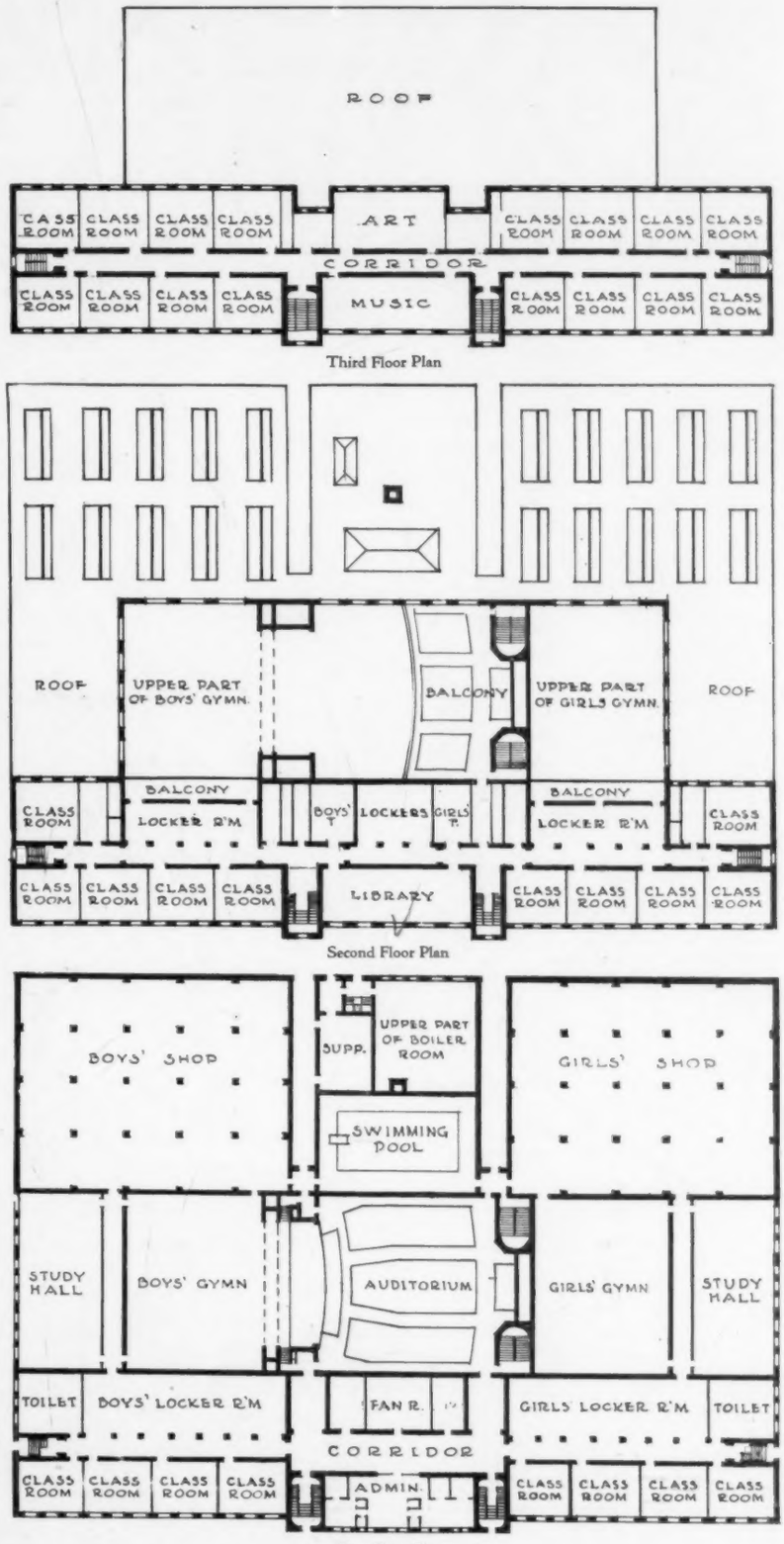
Assuming that 15 per cent is the average amount of waste space in these new types of plans, there is a difference of 10 per cent between the average waste space in the Cleveland schools to-day and the waste space in the proposed new types.

Therefore, 40 per cent of the 1,250,000 square feet of stairs and corridors in the buildings of our present system has been criminally wasted.

This is equivalent to 625 class rooms, representing seating accommodations for 25,000 children, and these 625 class rooms at the present cost of construction in Cleveland would require $15,000,000 to replace. These 625 class rooms seating 25,000 children represent the actual shortage in Cleveland to-day.

Using the ratio of population of Cleveland to that of the nation, mentioned above, the unnecessary waste in the entire country amounts to 75,000 class rooms, or seating space for 3,000,000 children, and the replacement cost is $1,500,000,000.

While I believe the figures I have quoted are fair, yet for the sake of making the comparison fairer on account of lower building costs in some sections and possibly less waste in others, let us arbitrarily reduce the waste by 33⅓ per cent, with the result that space equivalent to a seating capacity



Combination One- and Three-Story Junior High School. Front Section, Three Stories of Class Rooms; Auditorium and Gymnasium in Center; One-Story Shops in Rear

W. R. McCornack, Architect

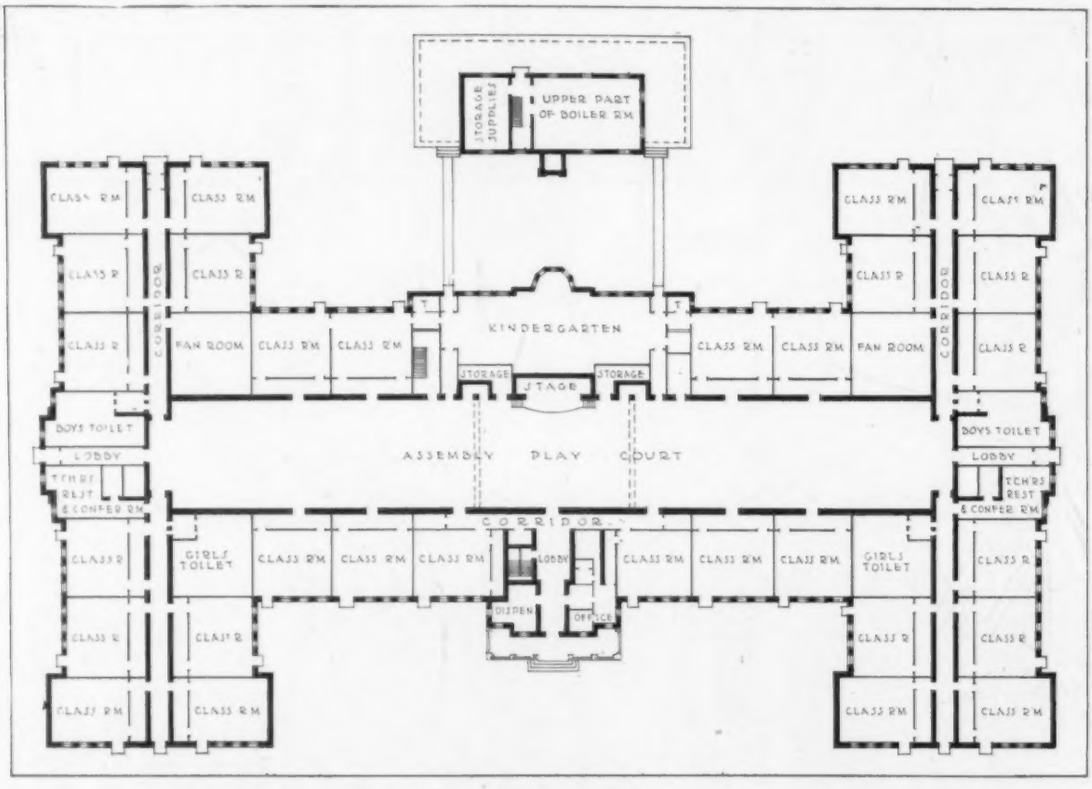
for 2,000,000 children at a replacement value of $1,000,000,000 has been wasted in the schools in this country, while cheaper school buildings have been made necessary, while the children have been denied the refinements in equipment which they should have and the community, buildings of the highest architectural and structural standards. Such architecture produces structures whose cheapness results in a tremendous overhead cost of maintenance, and these results have been brought about by architects who have not thought of buildings as having a financial return on the investment.

This deplorable situation exists because a school building has never shown nor is it probably possible to have it show a financial return on the investment.

Hotels and office buildings require a large amount of stairs, corridors and lobbies, because of the small units, each of which must be reached independently, yet no hotel or office building properly planned shows more than 15 per cent in waste space, and mercantile establishments and factories almost nothing. No architect could survive who planned buildings of this type, which require a definite financial return on the investment, who would plan a building with the excessive amount of waste space existing in our schools. In addition, add to the corridor and stair waste all the basements, oversized rooms, schools used during a small portion of the year, and we have a condition of waste of school funds so stupendous as to be almost beyond belief.

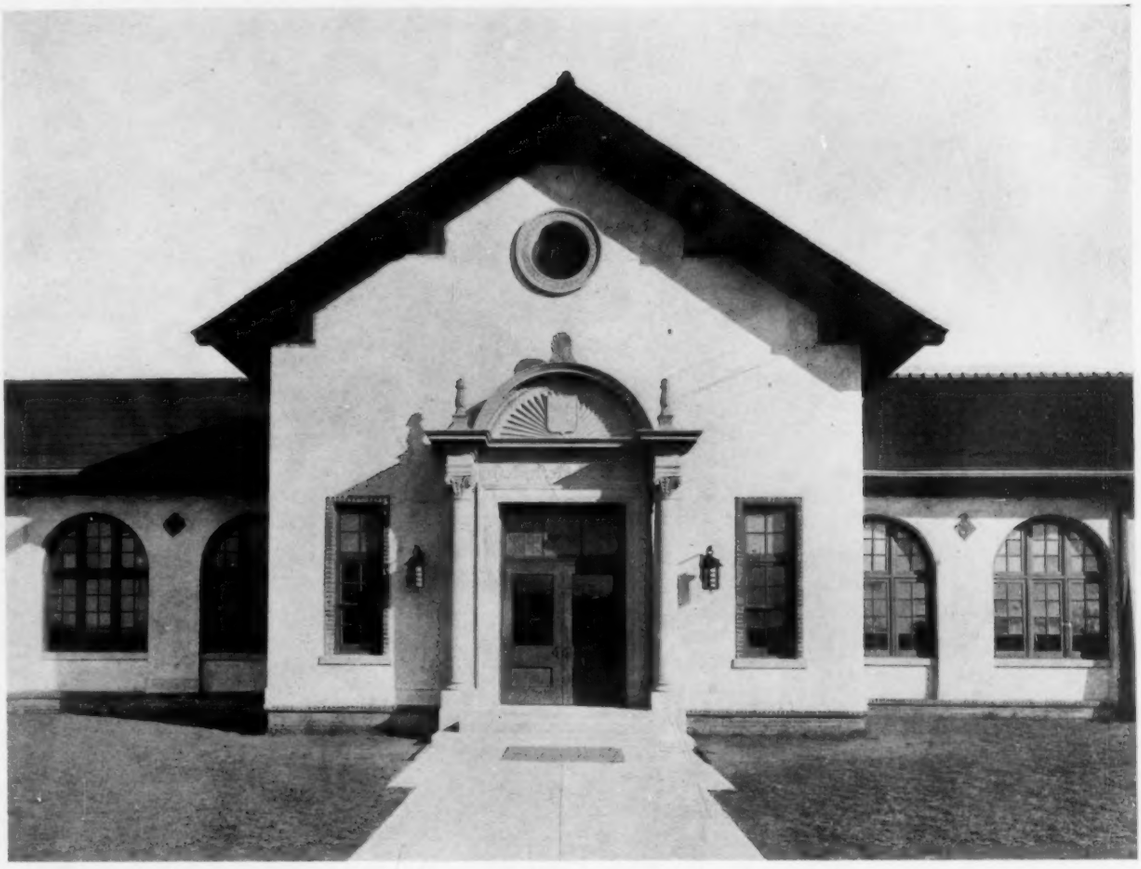
The plans illustrated are a great advance, and we believe that they are merely pointing a way toward a broader and more comprehensive study of school buildings, which shall be more elastic and less wasteful. Let us strive for better architectural service (the lack of which has been the actual cause of this terrible waste), as it is the chief medium through which better conditions can come.

It is time for all school architects and school men to stop and at once inaugurate a policy of intensive study of the school building problem; to reduce its cost without injuring its beauty and its usefulness or construction value, and I believe this study should be concerted and nation-wide, and that a National Bureau for such study is not too visionary a proposal to be idly passed by.



One-Story Corridorless Elementary School with Large Central Play Court. The Auditorium Formed by Double Movable Partitions, Thoroughly Sound-proofed. All Class Rooms Have Separate Outside Exits

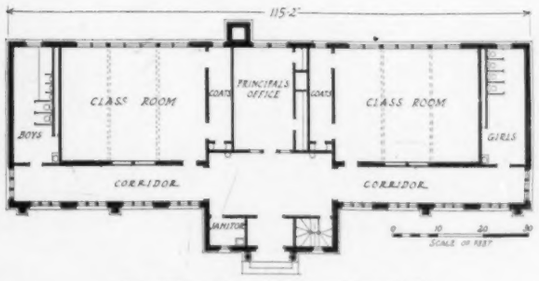
W. R. McCornack, Architect



The Whittier School, St. Joseph, Mo.

ECKEL & ALDRICH, ARCHITECTS

A FUNDAMENTAL principle in successful school planning is the provision for future growth of the building. The school illustrated herewith is an interesting example of such planning in the one-story type of school which is rapidly gaining favor in many sections of the country where sufficiently low land values make the scheme practical.



First Floor Plan of Portion Now Built

The first portion of this school to be built constitutes but one-quarter of the complete building, and on this page is shown a detailed first floor plan of the first unit. The central portion is excavated to full depth and contains the boiler room in the basement. The remainder, with the exception of space for a fuel room at the left of the boiler room, is excavated only sufficiently to give a clear space of 3 feet below the floors for the passage of heating ducts and plumbing pipes.

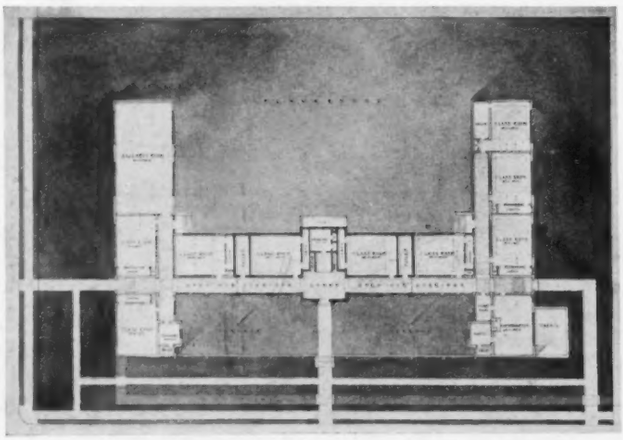
The main walls of the building are of brick resting on concrete foundations. The construction of the boiler and fuel rooms is entirely fireproof, to prevent the spread of fire to other parts of the building. The parts of the first floor not over the boiler room are of wood construction. The roof is framed in wood with shingle covering and tile ridge. It is planned to have a new covering of tile when the remainder of the building is constructed.

The exterior is of white stucco with the openings and base course trimmed with red-face brick. Just below the eaves is a row of dull green and yellow tiles, outlined with one course of dark-red brick. The woodwork is of cypress and stained brown. The doorway is buff Indiana limestone.

General View of First Portion To Be Built

The building is heated and ventilated with what is generally termed the "split" system. The corridors are supplied by direct steam radiation. Direct radiation is also used on the exposed sides of the class rooms with intakes and outlets for hot air on the room side of the corridor walls.

The corridors have large window openings fitted with casement sashes so that they may be made virtually open-air rooms and are used for play space in inclement weather. Each class room is an independent unit, complete with coat room and teacher's closet. The toilets as built are sufficient to meet the demands of the completed building. The fixtures are set away from the main partition wall a sufficient distance to allow a utility corridor two feet wide behind them, in which vents and pipes are carried.



Floor Plan of Proposed Completed Building

The completed building will have nine class rooms similar to those now constructed. The rear of the left wing will be devoted to an assembly room and the front of the right wing to the kindergarten unit.

Front Elevation of School When Completed

Interior Decoration

SOME DOMESTIC INTERIORS FROM THE WORK OF DELANO & ALDRICH

By HELEN CHURCHILL CANDEE

IF America has a style of her own in architecture it is that classic result loosely called colonial. We come back to it over and over again after wandering in the alluring paths of the Elizabethan, the Italian, the Gothic. It calls to our race. Our early settlers were mainly English colonists, bringing with them English architectural traditions. Our great national ideals, our standards of conduct that the nation upholds, are they not the same that came from England with those colonists on whom rests the honor of having formed this great country? The millions who seek our land to become Americans, do they not find as a dominating influence at the core of our apparently loose politics the strong English rectitude and high ideals which withstand attack?

The architecture of England came to us when we were a colony of England, and it stays with us, even as the moral code stays with us, and both are adopted by the newcomers, no matter what may be the land of their origin. The colonial style is the crystallized racial taste of America formed at a time when our population was less varied.

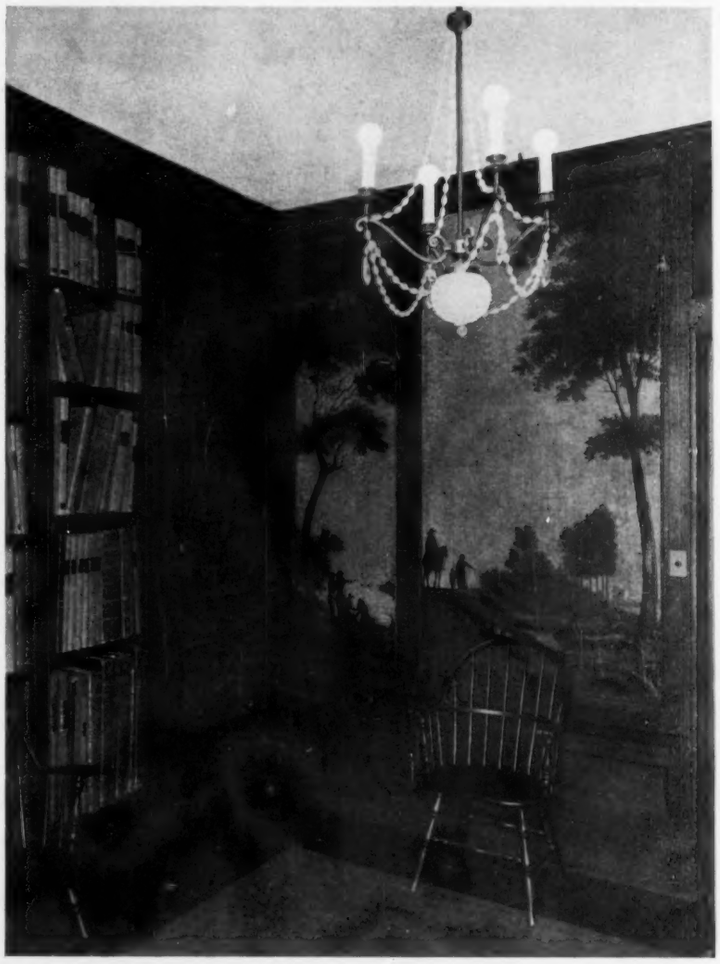
Certain of our architects feel this to a degree that makes them devote their talent almost exclusively to its use. Among the most eminent of these are Messrs. Delano & Aldrich of New York who adapt the style to the ever-increasing demands of modern life. Comparatively few large houses were built in our colonial days. Perhaps Westover leads in size and beauty. But the demand today is for the large country house. The style adopted by the architects to whom we refer is one that can equally be a delight to the eye in the small cottage and in the home built for the large family with many guests.

The style, as these architects employ it, is one that conveys peace and rest. Long, simple lines, unbroken spaces, an effect of calm, these contribute to peace of mind when the hours come for relaxation within the home.

The way taken to give us such homes is to adhere to the classic tradition and to resist all alluring innovations. An adaptation is not a novelty; it is merely the spelling of a new word with the old letters. It is the building of a home unlike any other with the colonial principles of architecture and detail.

The town house has so many restrictions in the way of space and light that its problems are not easily adjusted. But a study of these illustrations will give an idea of the possibilities of beauty when a man of talent arranges the plan.

The dominant idea is space, to give its semblance even when it does not exist in reality. First comes the subtle matter of proportion. The measure-



Detail of Bookcases and Wall Treatment in Library,
Office of Delano & Aldrich, Architects

ment of the ceiling's height shows how important is a high ceiling to impart a feeling of repose. We are satiated these days with the so-called "cozy" room, over which broods a ceiling almost suffocatingly near. It is but a ruse of the builder, in both house and apartment, to cheapen the building's cost. The mistake of a ceiling which weights the head is never made by Messrs. Delano & Aldrich. Rather, in rooms of their designing, one unconsciously straightens the frame and throws up the head as when under the open sky.

Space is also conveyed, in the examples given, by great simplicity in construction. Whenever possible a wall is left unbroken. Large architectonic features are omitted except where rooms are actually of great size.

As to details of ornament, they are almost invariably small, counting as a line of fretted shadow rather than as a distraction of the attention. It is a clever way of respecting space and yet attaining beauty. Classic ornament lends itself to this happy use. It has the adaptability of a charming woman and fits itself to any position. The old repeats sing the music loved of all the ages since the Greeks invented them — the rounded egg-and-dart, the tongue tip of the palmette, the dentil, the acanthus—just a bit of the latter cut with a niggard's hand from the luxuriant plant — all of these are used as hems to the garment, not as the main feature of the plan.

When a room is to be in the grander manner which still clings to the classicism of Sir Christopher Wren, a heavy pediment is allowed above the door or over-mantel. And then the massive chords of the styles called Georgian are played upon. That designation is ever obtruding itself upon the term colonial, and both are shockingly misused. Everyone knows that our colonial life ended with the entry of the Fourth of July as a national holiday. Yet, as a style, the colonial stretched itself along through the century to include the copies set by the Brothers Adam, for that, too, was but a variant of the Greek in inspiration. Also the elasticity of the term causes it to be stretched over

Wall Paneling in Dining Room and Vista Across Hall, House of Mrs. Willard Straight, New York City

LIBRARY IN WALNUT, HOUSE OF MRS. WILLARD STRAIGHT, NEW YORK CITY
DELANO & ALDRICH, ARCHITECTS

Staircase with Wrought Iron Hand Rail

the inspiring work of l'Enfant in Washington which was erected when the colonies had been a nation for a quarter century.

It was perhaps the Octagon — historic and exquisite — which inspired Delano & Aldrich in the wholly satisfactory entrance hall of circular plan. It is an entrance which at once produces an effect on him who enters. There may be a rabble in the street outside, noise and dust of a city, but the moment that such a hall is entered peace abounds. Thus it gives a benediction and a greeting and sets the mind's mood in a key which produces harmony. This is no imagining; the anteroom of each house we enter is an indication of the spirit that prevails throughout, and these architects give to their houses the effect of quiet elegance, of simple dignity, of an erudite taste, all forecast at the very steps of the wide front door.

A circular entrance hall is a bewitching thing. It is the hub, the center, from which stretch vistas in alluring rays. A domed ceiling is the only appropriate finish to this room of temple-like dignity and purity of style, a dome cut into by the four openings and ornamented with four discs and simple panels outlined with classic motifs. Door openings there must be, and where these would spoil a delicate symmetry they are balanced by a resort to a niche in the wall, framed with a square. The decorative treatment of the niche follows, a Greek amphora within the shelter and a console standing below.

There is ever a charm about a floor laid in marble. This charm becomes a fascination when the central point is a rosette, and around this the blocks of black and white circle in ingenious symmetry. It is just such little surprises as this lively floor in the sobriety of the entrance hall that give individuality and distinction to the best adaptations of the colonial style.

Cool gray walls of the entrance lead naturally to a cement wall on the stairs, and this in most instances is finished to indicate stone, either with blocks merely outlined or with the deeper cutting of the reveal. The stairs themselves are of stone or one of its substitutes, and in them are thrust the iron uprights of the stair rail. This rail is always simple, never attempting the elaboration of the ironwork of Italy or France or Spain. And by this simple, light construction it seems to mount of its own delicate buoyancy. It needs no recourse to sham, it is unaltered as it mounts, as it has had at the start no elaborate elegance too extravagant for upper quarters.

It is a fancy of these architects to place a room halfway up the stairs, a sudden surprise of a room. It is a low-ceiled *albri* of warm shadows, dark woodwork, inviting easy chairs and cushioned sofas. It is a place wherein to smoke and ponder over pleasant matters. Something of the charm of being under the eaves is there, gained by the contrast with the high-ceiled rooms of the floor below and the floor above, for this room is a mezzanine all of itself, tucked in between stories and over the butler's pantry or some such plain utility. In the house planning of today this trick of surprise is generally forgotten. Old houses of luxury have it, those in England and a few here in America. It is a fashion worth reviving.

The living room is the heart of the house. When Delano & Aldrich can light it with clear sunlight they give it character by darkening all the walls from floor to ceiling with walnut in its own rich, neutral brown. The entire wall spaces are made

of alternate square panels and round-topped and recessed book shelves. An ornamental frieze is carved and set to finish the top as a cornice.

All this sounds as though the colonial, the classic, were left behind. But have we not said that it is the part of cleverness to adapt the old to modern uses? A big white room is rarely as "homey" as a darker room, and rows of books never decorate as well in a setting of white. So the living room or library is best finished in dark natural wood. But lest one think the room shows an anachronism in contrast with the house of colonial style, examine the carving of this room to discover the dominant classic note. The Greek key, the beading, the chalice, the zodiac signs are all there.

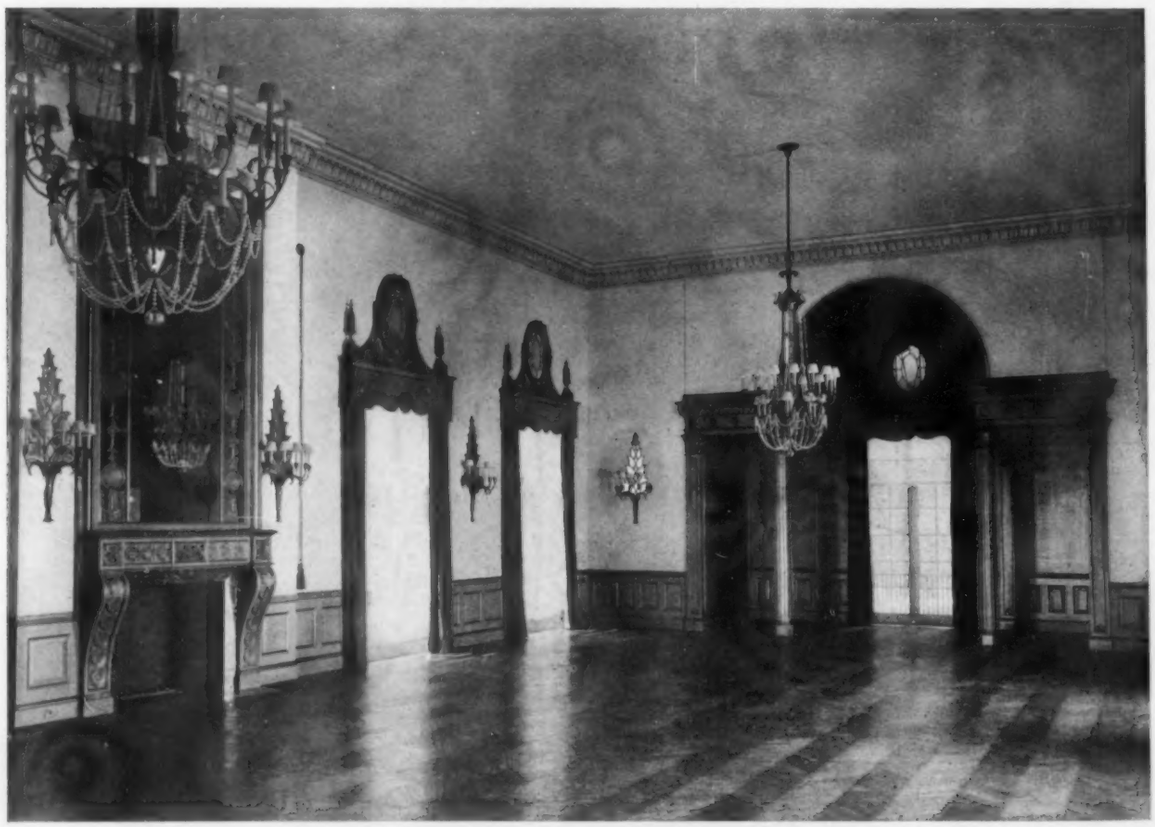
So often is a so-called colonial dining room an affair of chilliness that Delano & Aldrich avoid its thin attenuation and make it as sumptuous as white can be by employing the grandeur of the Georgian masses. Delicacy is deliberately thrust into the confines of certain rooms appropriate to its fineness, but in the dining room massively framed doors, a mantel broadly proportioned and panel mouldings of size and strength appear in better keeping. The cornice, so slight in other rooms, becomes here an affair of heavy brackets and shadowed mouldings, while door and mantel gain dignity and elegance from forceful pediments. Panel mouldings are studied to thrust the panel forward and to keep the stile in its modest place of retirement. This in itself is a matter too often forgotten, and, in less careful work, the paneled room is merely a flat wall on which are tacked the lengths of moulding which indicate a panel.

Alexandria, Virginia, in its newest aspect, is a town drunk with industrialism, but under the debris of old grandeur and new smokiness is hidden an old ball room where the ladies from Mount Vernon and the ladies of town and countryside used to dance and courtesy in silken elegance. The atmosphere of that old ball room with its fine carved decorations of dentils and beadings, its musicians' gallery, its suggestions of all the ornamental side of life,—that atmosphere is given by these architects to a modern room for dancing. Fearing lest the late colonial be too thin a style for such large spaces, the usual architect draws on the more voluptuous and highly decorated styles of France. The result is that most private ball rooms look alike. In the planning of the ball room in the Newport house of Mrs. Harry Payne Whitney, Delano & Aldrich dare to show the grace and

Entrance Hall in House of Mrs. Willard Straight, New York City

elegance appropriate to the use of the room. A strongly decorative feature is the fixture for lighting so large a room. Mr. Aldrich of the firm is particularly successful in designing lighting fixtures and he recognizes their importance as a decorative accessory, and thus is absolute harmony maintained. But after all it might seem that the architectural opportunities presented by even the most important city residence are somewhat meagre when compared to the far broader possibilities offered when a country house of equal importance is under consideration. Messrs. Delano & Aldrich are particularly successful in their development of country house architecture and many great houses on Long Island bear eloquent testimony to their skill and discriminating taste. Theirs is an especially happy faculty of interpreting the spirit of the style which they handle so well and adapting it admirably to the work in question. It has already been said that the colonial style is very well adapted to the small cottage, as well as to the house which is the center of an extensive country estate and these architects have been singularly, and possibly equally, successful in both of these somewhat different fields. It might be held that one criterion of the best taste in architecture would be the designing of any building with just the requisite degree of architectural formality.

Through such work as we have been considering are preserved the best traditions of the only style in architecture that is racially American, that is appropriate all over our broad land and that can be always repeated *ad infinitum*, but never, in its purity, *ad nauseam*.



Ballroom in Newport House of Mrs. Harry Payne Whitney
Delano & Aldrich, Architects

Grand Lodge Hall

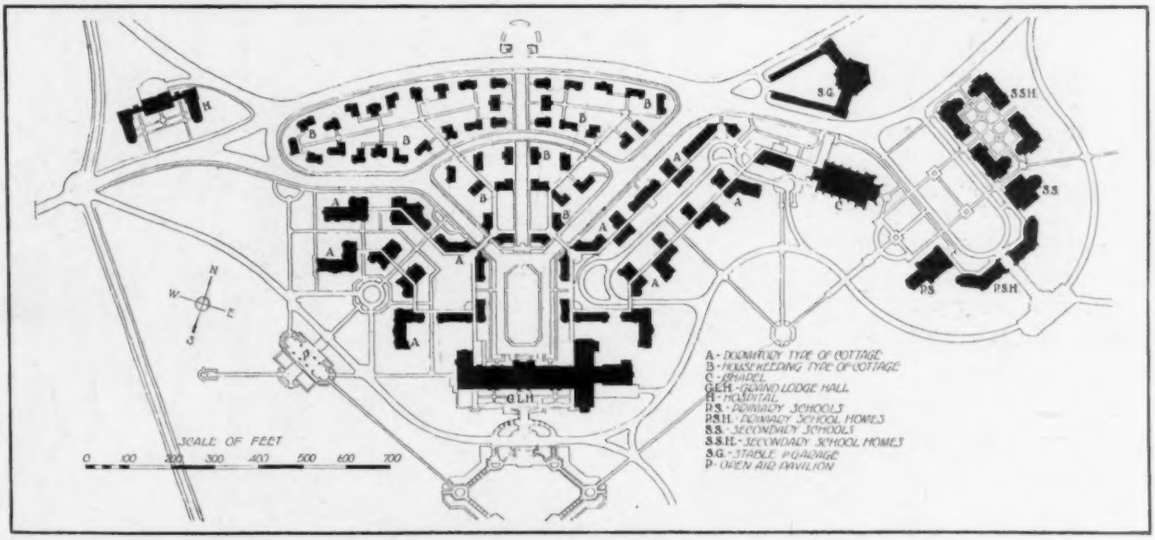
A HOME FOR AGED MEMBERS OF THE MASONIC ORDER IN PENNSYLVANIA

ZANTZINGER, BORIE & MEDARY, ARCHITECTS

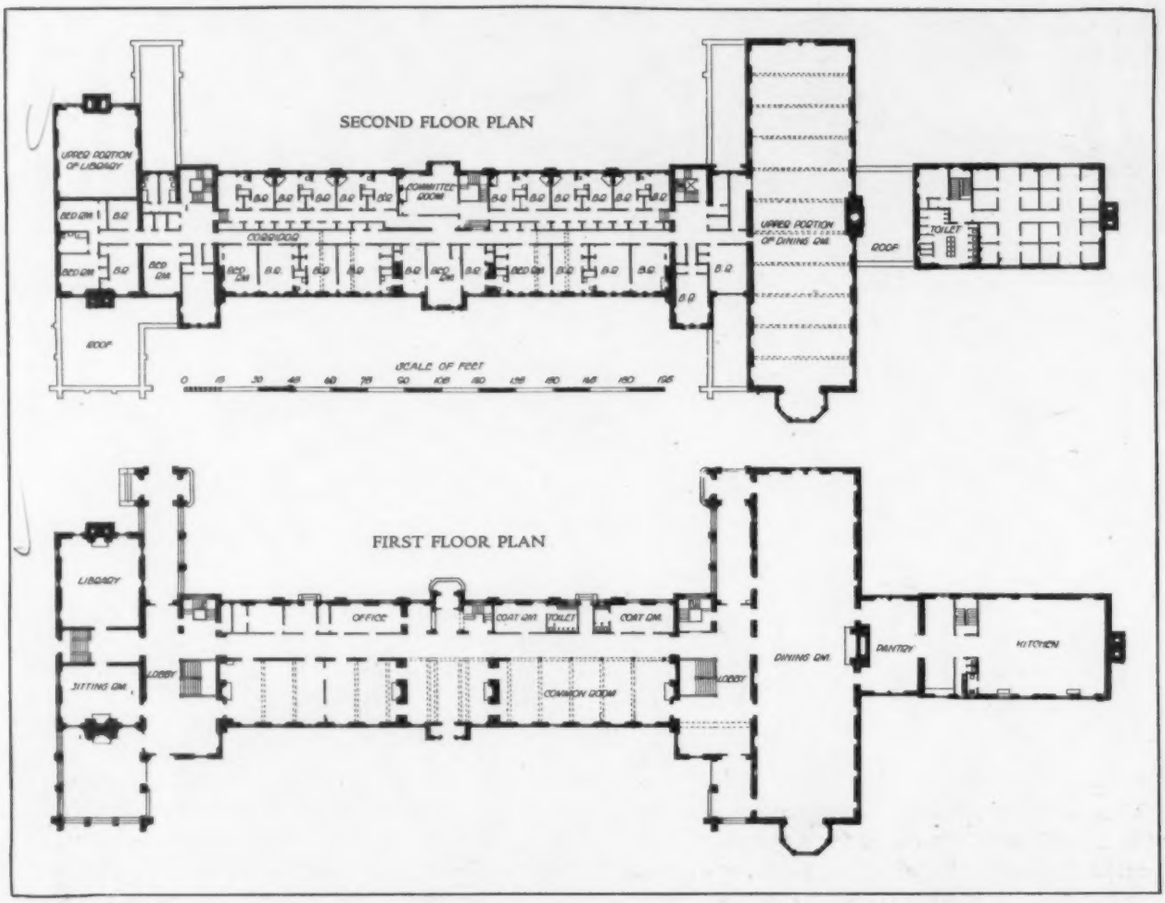
THE plans of the estate of the Masonic Home of the Grand Lodge of Pennsylvania show a highly interesting and very complete development of a great residence, or home, maintained by a large fraternal order. The estate comprises some 981 acres of land in Lancaster county, made up by the purchase of several old farms, upon which many of the original farmhouses are yet standing.

The plans of the architects, Messrs. Zantzinger, Borie & Medary of Philadelphia, call for a grouping, spacious and complete, of all buildings and minor or accessory structures necessary for the comfortable maintenance at present of over one hundred residents and for a much greater number later on,— members of the Masonic order or widows or dependent relatives of members.

The architects seem to have been singularly successful in giving to the Home an atmosphere or appearance which is very rarely found in so large



Plot Plan Showing Complete Development of Masonic Home at Elizabethtown, Pa.



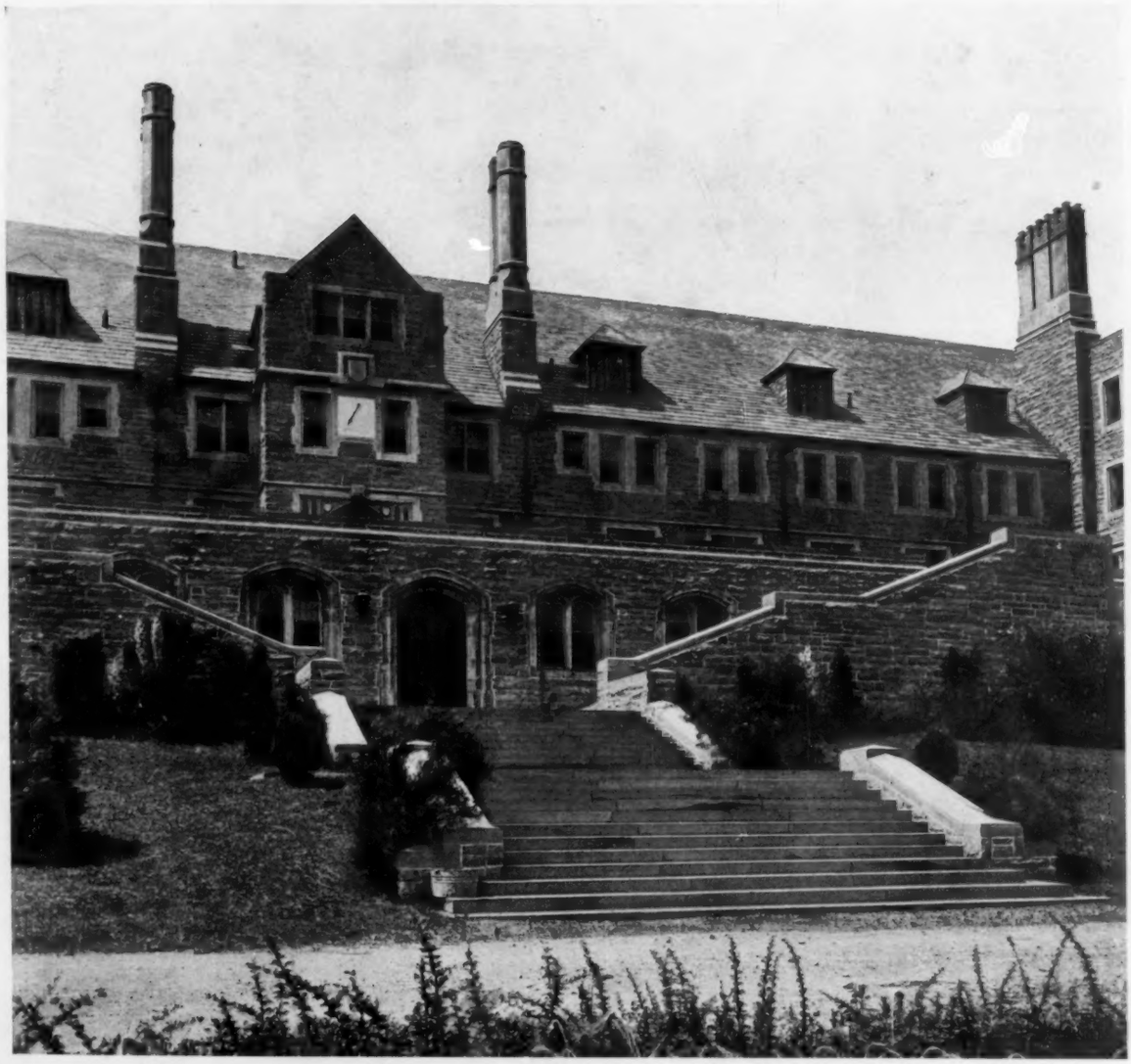
an establishment. The estate is completely lacking in what might be called the "institutional" atmosphere and possesses instead much of the air of a very large and generously appointed country estate where unusual attention has been paid to the working out of the architectural problems.

It has been found desirable to build the more important structures at present, leaving the complete development for a time when building may be more advantageously undertaken. The great area of the ground makes possible an excellent arrangement of a main, or administration, building, surrounded by smaller buildings to be used as dormitories for individuals, small cottages or bungalows for others who may prefer this method of living, and the most attractive arrangement of schools, chapel, gymnasium, hospital, lecture rooms and social or recreation centers and for what might, in a sense, be called public utilities, such as garage, power house, etc. The buildings intended to be used as living quarters are to be connected by a cloister or covered passage with glazed windows, by which each may be reached from the main, or administration, building. The treatment of the hospital building, the structure to be used as stable and garage and the various school buildings seems to call for particular notice. The hospital is placed at some distance from the other buildings of the group and its plan makes possible the flooding of each of the different rooms with sunshine during several hours of the day. The stable and garage is to be provided with shelter sheds which will enclose a parking space large enough to park thirty-five cars, so that a motor, having brought a visitor to any building upon the estate, may be parked in one of the shelters until it is needed. The Home will provide for quite a large number of children of former members of the Masonic order, and the plan here to be followed will provide for the grouping about a school green of a number of cottages in which the children may live and the various school buildings which will be required. It has been found to be better to provide a number of small school buildings, one for each grade, than to have one larger building to accommodate students of different grades. These school and residence structures will be most picturesquely disposed about what will probably be the children's playground.

The main building, Grand Lodge Hall, is now

completed and in use. While it has been planned to be eventually an administration building, it does duty at present as a home for such residents as have already arrived. This building is long and rambling, and though three stories high its unusual size gives it a somewhat low appearance. The walls are of Holmsburg granite trimmed with Indiana limestone, the roofs are of slate, and many stone mullioned windows, boldly projecting dormers and stone chimneys with chimney pots heighten the English feeling of the Tudor architecture in which the buildings are designed. This English character is heightened still further by the long, flagged terrace which extends the full length of the building, closed in at either end by extending wings, beyond which are still other smaller wings and service courtyards enclosed by high walls.

The main entrance to Grand Lodge Hall is from the terrace into the long hallway which extends the entire length of the building. Opening from it are the common room, coat rooms, various offices and sitting rooms, and the office of the Home from which a stairway leads to a steel vault in the basement. At one end this long hall opens into the library, two full stories in height, and into several small card rooms and a sun room, while at the opposite end it leads into the great dining room, a strikingly successful hall about 140 ft. long, 40 ft. wide and two full stories in height, one entire end being taken up with a mullioned bay window. The trusses of the open timber roof are supported on stone corbels; tall mullioned windows are placed just below the roof lines and a paneled wainscot extends about the room at the height of the



View of Grand Lodge Hall Showing Approach to Terrace from Driveway

cornice of the stone mantel. The lighting fixtures of this great dining hall or refectory are of wrought metal of a striking design.

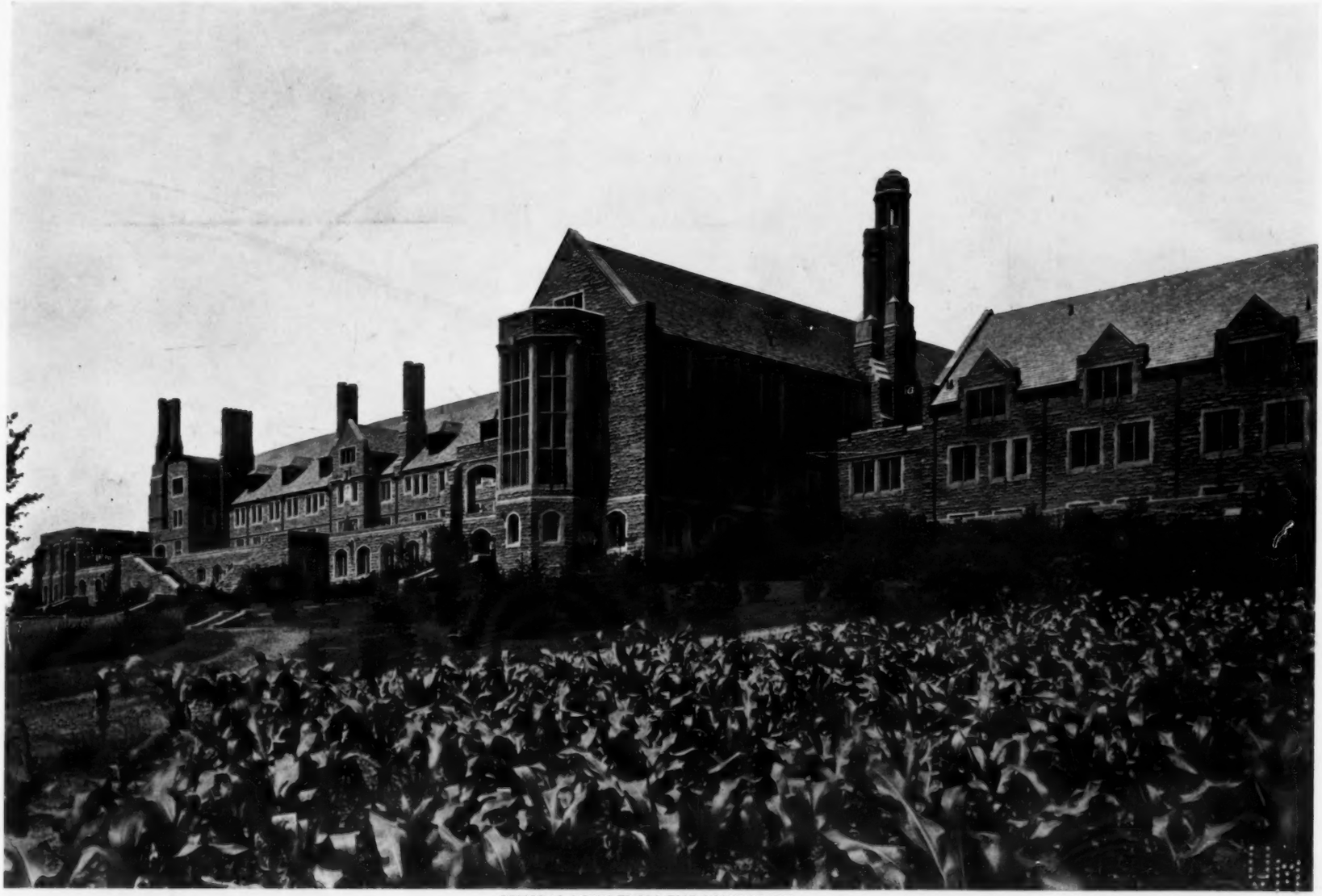
Cold storage rooms are in the basement. The service quarters, such as kitchens, pantries, bakery, freezing room and steward's rooms, occupy one floor of a small wing to themselves, while on the floor above are sleeping rooms and various lavatories for those who work in these departments. Since this structure is intended as a home for members of a fraternal order, many of whom may be of an advanced age, considerable attention has been paid to stairways, — easy of ascent, planned with many landings and placed where a stairway may be quickly reached from any part of the building.

Detail in Corner of Quadrangle

Upon the second floor of this building there are many bedrooms, most of which are so planned that a bath adjoins. Here are also the linen rooms and various domestic departments which belong on a bedroom floor. The upper floor is divided by low partitions into many small cubicles or sleeping rooms.

Grand Hall Lodge, with its wings and accessory buildings, partially surrounds a courtyard or garden in the center of which is the flagpole. All the buildings have been planned so that additions may be made from time to time as circumstances may warrant without disturbing to a great degree any of the existing departments. A spur track from the railroad comes into the grounds, which makes comparatively easy the handling of large quantities of building material or quantities of coal, for it leads to the power house from which heat, etc., for the entire plant is produced. At present only a suggestion may be had of the planting and landscape work which will later add much to the appearance of finished symmetry which is a striking feature of this very important and successful work.

View of Model of Grand Lodge Hall and Adjacent Dormitories, Looking into Quadrangle
(Buildings in immediate foreground removed to show main building)



GENERAL VIEW FROM THE SOUTHEAST

GRAND LODGE HALL, MASONIC HOME, ELIZABETHTOWN, PA.

ZANTZINGER, BORIE & MEDARY, ARCHITECTS

DINING HALL BAY FROM THE SOUTH

LIBRARY WING FROM THE NORTHEAST

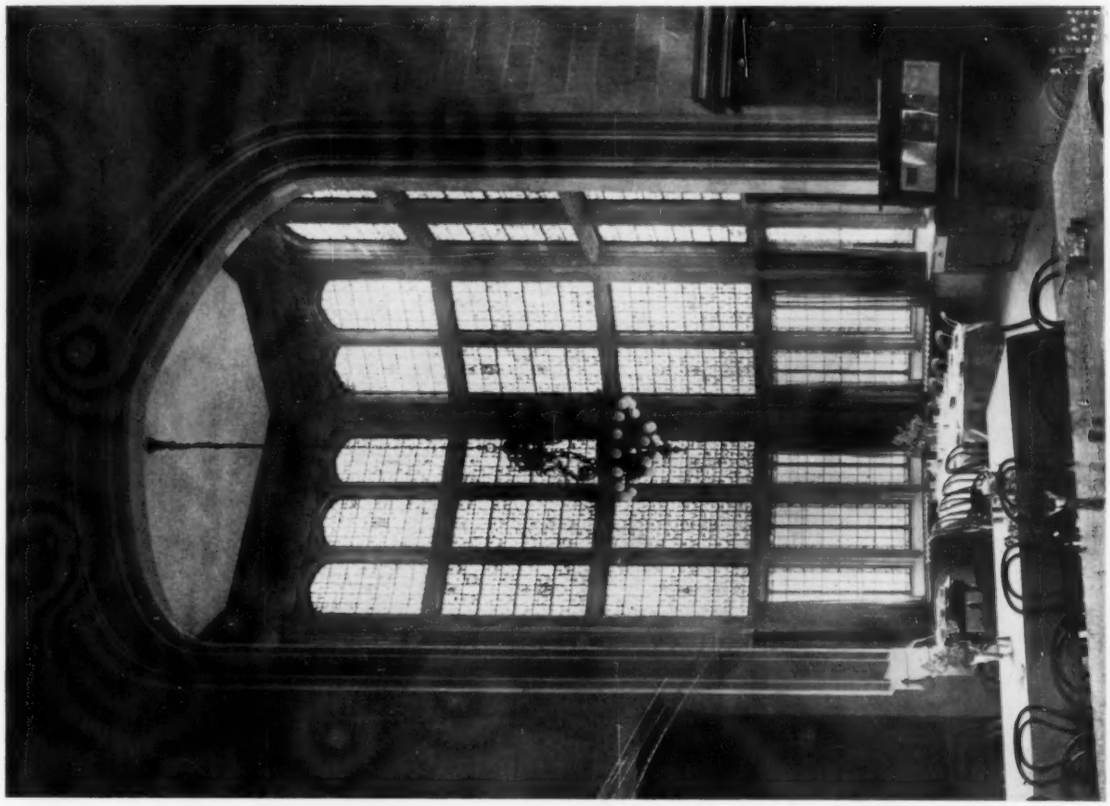
GRAND LODGE HALL, MASONIC HOME, ELIZABETHTOWN, PA.

ZANTZINGER, BORIE & MEDARY, ARCHITECTS

SERVICE SIDE OF DINING HALL

GRAND LODGE HALL, MASONIC HOME, ELIZABETHTOWN, PA.

ZANTZINGER, BORIE & MEDARY, ARCHITECTS



INTERIOR DETAILS OF LIBRARY AND DINING HALL

GRAND LODGE HALL, MASONIC HOME, ELIZABETHTOWN, PA.

ZANTZINGER, BORIE & MEDARY, ARCHITECTS

ENTRANCE FRONT FROM THE APPROACH

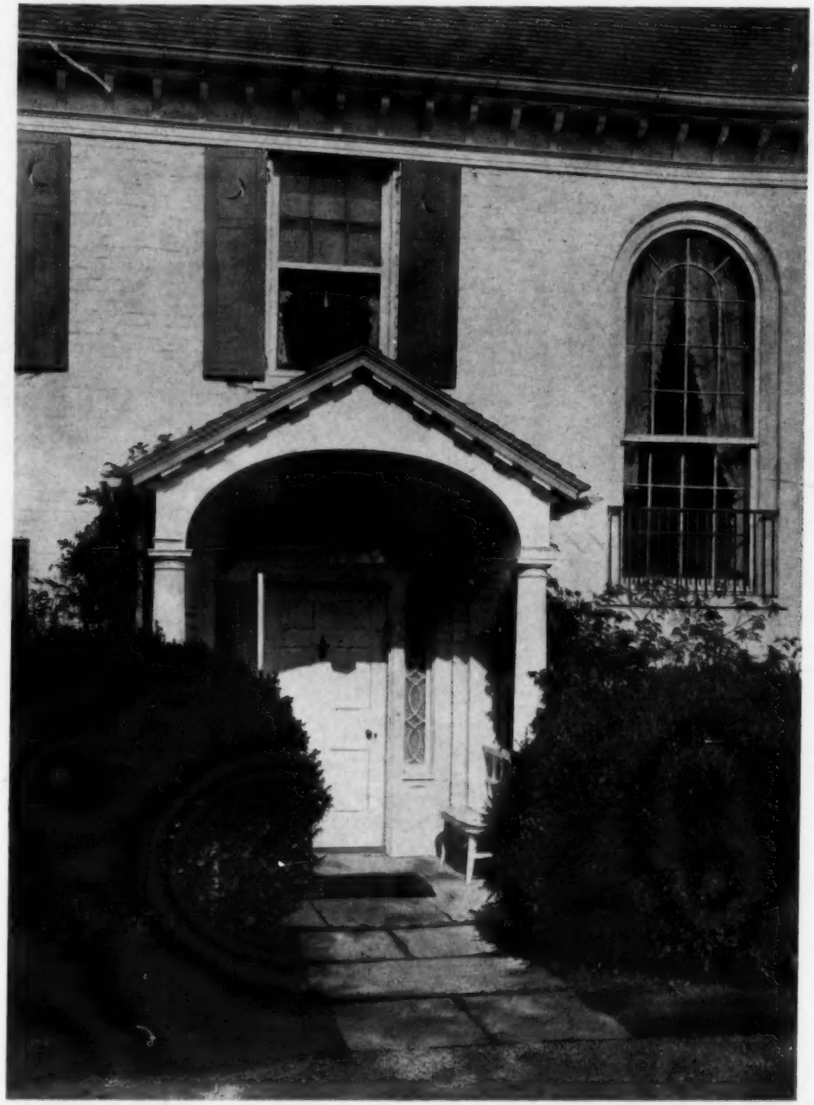
HOUSE OF REEVE SCHLEY, ESQ., FAR HILLS, N. J.

PEABODY, WILSON & BROWN, ARCHITECTS

COLONNADE ON GARDEN FRONT

HOUSE OF REEVE SCHLEY, ESQ., FAR HILLS, N. J.

PEABODY, WILSON & BROWN, ARCHITECTS



DETAIL OF ENTRANCE PORCH AND COLONNADE

HOUSE OF REEVE SCHLEY, ESQ., FAR HILLS, N. J.

PEABODY, WILSON & BROWN, ARCHITECTS

VIEW OF LIVING ROOM

VIEW OF LIBRARY

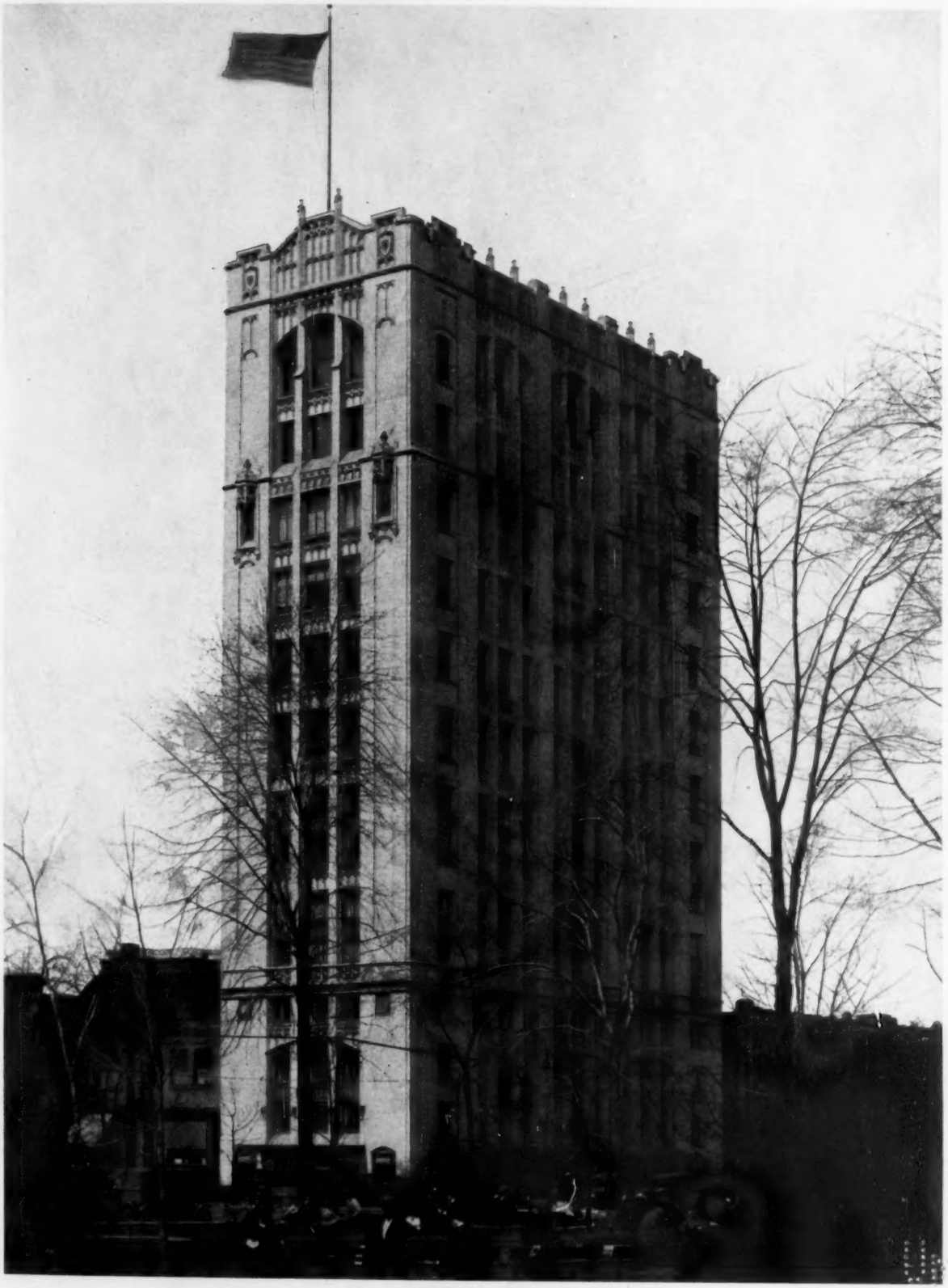
HOUSE OF REEVE SCHLEY, ESQ., FAR HILLS, N. J.

PEABODY, WILSON & BROWN, ARCHITECTS

TWO VIEWS OF DINING ROOM

HOUSE OF REEVE SCHLEY, ESQ., FAR HILLS, N. J.

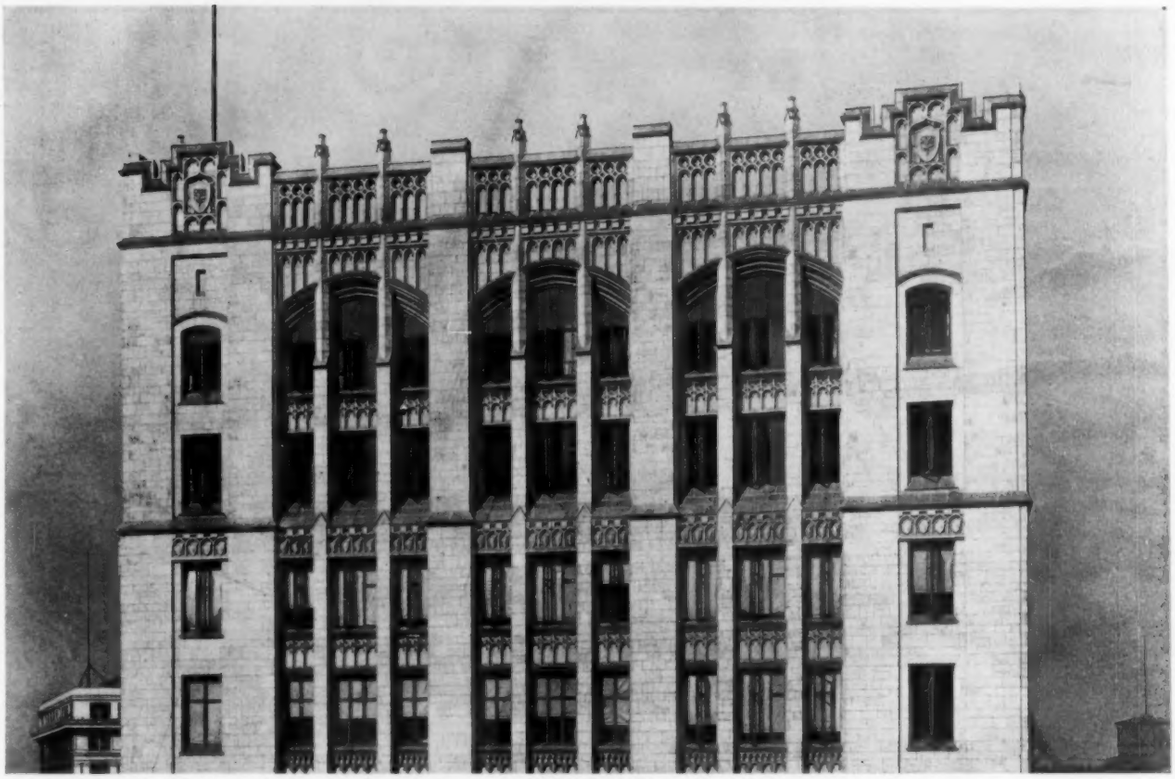
PEABODY, WILSON & BROWN, ARCHITECTS



GENERAL VIEW

FYFE STORE BUILDING, DETROIT, MICH.

SMITH, HINCHMAN & GRYLLS, ARCHITECTS

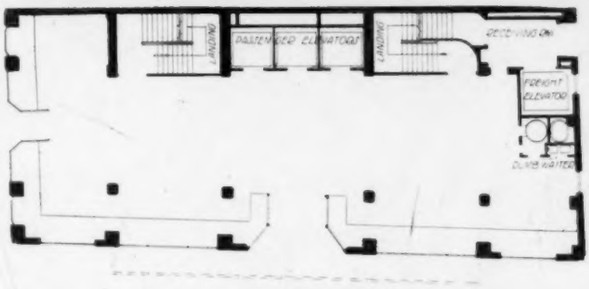


DETAIL OF UPPER STORIES

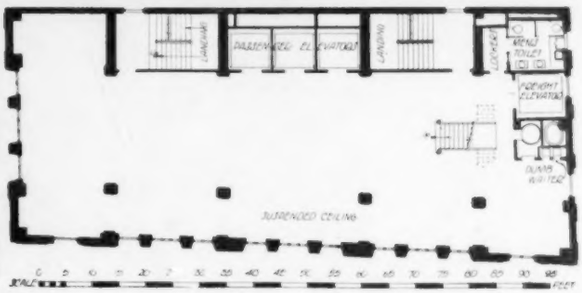
DETAIL OF LOWER STORIES

FYFE STORE BUILDING, DETROIT, MICH.

SMITH, HINCHMAN & GRYLLS, ARCHITECTS



FIRST FLOOR PLAN

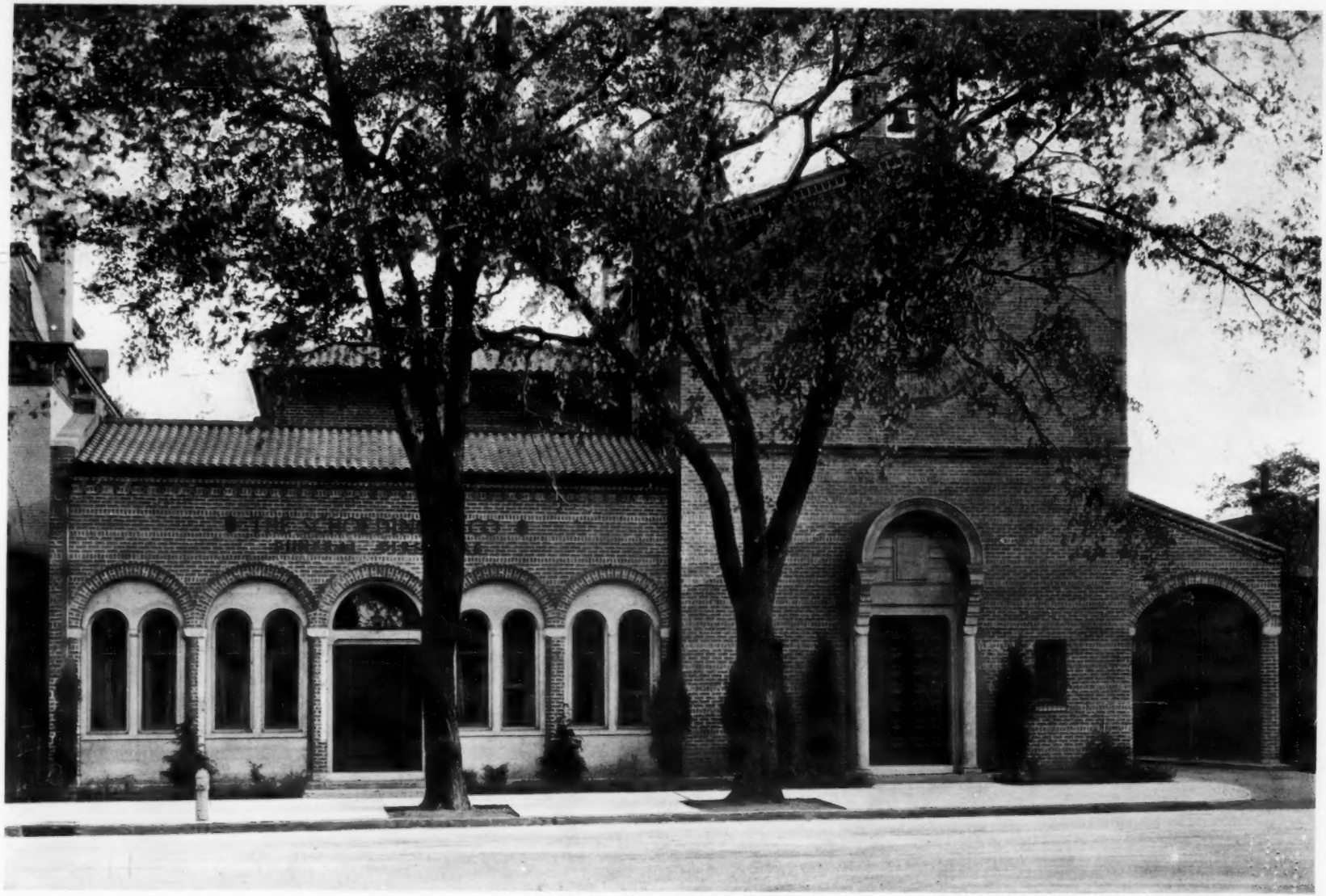


TYPICAL FLOOR PLAN

INTERIOR VIEWS OF FOURTH FLOOR

FYFE STORE BUILDING, DETROIT, MICH.

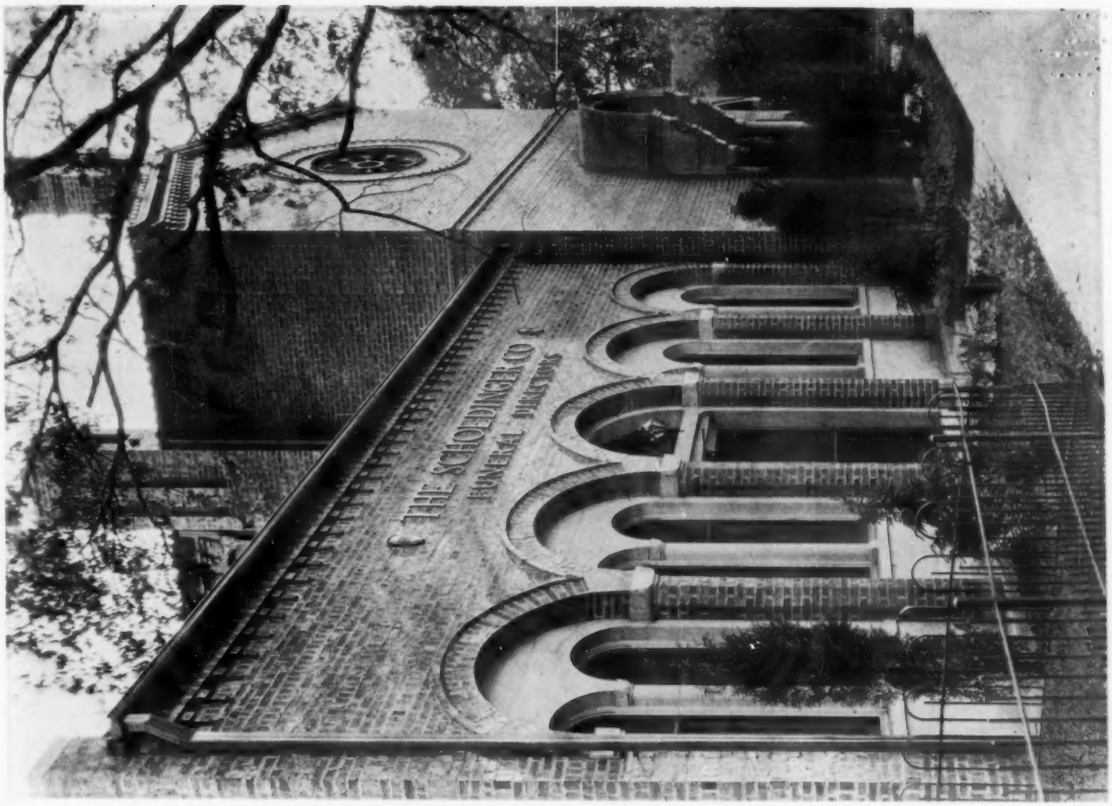
SMITH, HINCHMAN & GRYLLS, ARCHITECTS

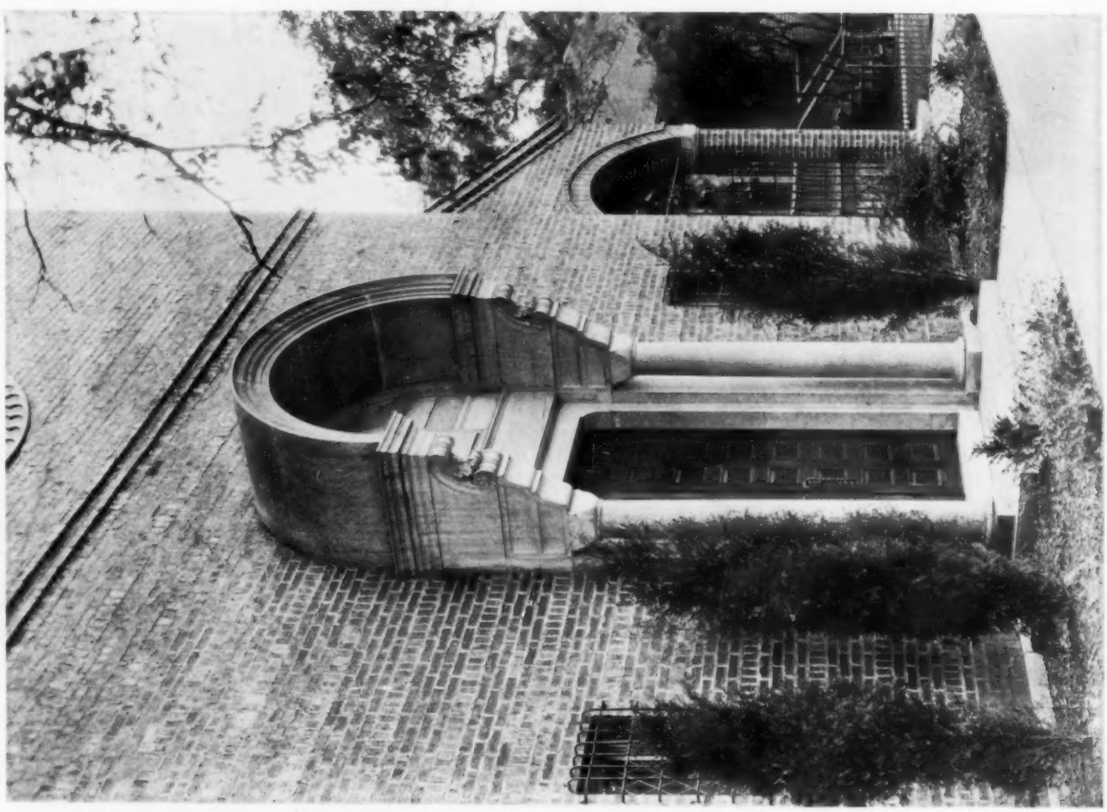


GENERAL VIEW OF MAIN FACADE

UNDERTAKING ESTABLISHMENT AND MORTUARY CHAPEL, COLUMBUS, OHIO

HOWELL & THOMAS, ARCHITECTS





DETAIL OF STREET FACADE

UNDERTAKING ESTABLISHMENT AND MORTUARY CHAPEL, COLUMBUS, OHIO

HOWELL & THOMAS, ARCHITECTS

DETAILS OF ENTRANCE HALL AND STAIR HALL

UNDERTAKING ESTABLISHMENT AND MORTUARY CHAPEL, COLUMBUS, OHIO

HOWELL & THOMAS, ARCHITECTS

CHANCEL OF THE MAJOR CHAPEL

UNDERTAKING ESTABLISHMENT AND MORTUARY CHAPEL, COLUMBUS, OHIO

HOWELL & THOMAS, ARCHITECTS

A Modern Undertaking Establishment

HOWELL & THOMAS, ARCHITECTS

By HOWARD DWIGHT SMITH

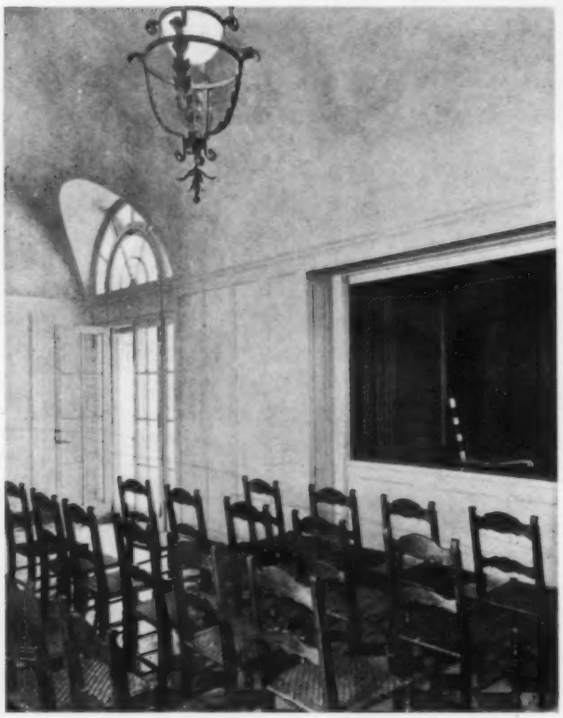
TO find an interesting piece of contemporary architecture in a medium-sized, Middle West town has been likened to chancing upon an oasis in a none too fertile country or to finding an uncharted haven in a storm. The leaven of good architecture is rather sparingly distributed between the Alleghenies and the Rockies. To pioneers the field is interesting. There are many cities and towns in this vast area of the country which are just beginning to feel the thrill of artistic awakening which the metropolitan district must have felt back in those days when the Architectural League was in its infancy—in those years whose activities were so interestingly and vividly described by Mr. Cortissoz in a recent review.

Columbus, Ohio, is one of the cities of the Middle West which needs an artistic and architectural awakening. It is doing the city no injustice to say that at present she is deficient in examples of good architecture. It simply bespeaks a bright future once she does awaken, for she will have the advantage of the experiences of her sister cities of Cleveland, Cincinnati and Akron to lead her on to better things.

It is said that when Pope Nicholas V began his great work of reëstablishing the Church in Rome in the thirteenth century, he placed great reliance upon the theory that the temporal power of the Church would be greatly increased and maintained by making Rome a city of great architectural splendor. It is largely because of the magnificence of the structures erected during his time and in the centuries immediately following that we know and study and revere their monuments and the sentiments of that age. The average Middle Western town or city has no sentiment crystallized along any such lines, and, however far advanced it may be commercially or otherwise, it leaves a great deal to be desired artistically. And the term "artistically" is used in a serious and practical sense and not as a "pink tea" term of the so-called *intelligencia*. So it is a pleasant and gratifying surprise to find such an example of architecture as the Mortuary Chapel for the Schoedinger Co., Funeral Directors, at Columbus, as evidence of a little leaven in a large loaf.

In Columbus, as in most towns and cities which have experienced indiscriminate expansion, business zones are encroaching on residence districts in one direction or another. It has always been thus

General View of the Major Chapel

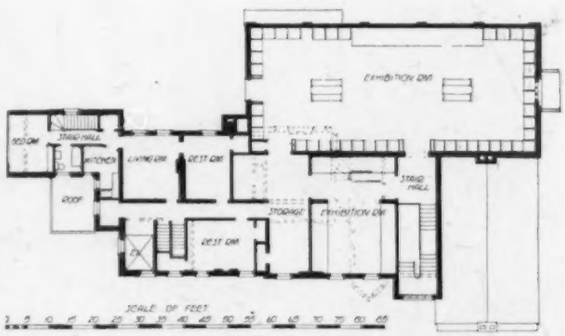


View of the Minor Chapel

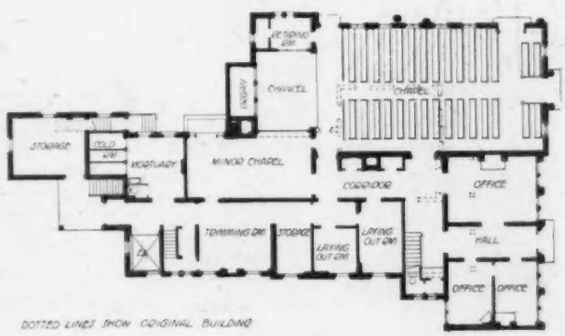
with our more or less haphazard methods of town planning. The encroachment has taken many forms, but it is nevertheless common to most growing cities. In such cases there are invariably problems presented which involve the use or adaptation of existing residential structures to new purposes. Such a problem was the Schoedinger Chapel. Ordinarily such commissions are not considered great architectural opportunities by the profession. Some notable examples of contemporary architecture bear evidence of the fact that it cannot always be predicted where or when the so-called architectural opportunities will crop out. The transformations wrought on the façades of some of the upper Fifth avenue residences are of this class. The alteration of the Edson Bradley residence in Washington by Mr. Howard Greenley, transforming a dry monstrosity of the early 80's into a chateau which rivals some of the real structures of the late French Gothic period, is another of this class. The Italian-like residence of the late John R. McLean, by Mr. Pope, began in his office as a more or less unimportant residence alteration. The success of the Schoedinger establishment warrants its classification with these notable alterations which we have just mentioned.

The plan sheets of the set of contract drawings show the usual double group of contrasting symbols for the representation of existing and new work. But the art of dressing up an alteration with a new front has been practised here with consummate skill. It is with results such as these that the architect justifies his connection with business structures. Business men as a rule to-day only employ the architect when it means dollars and cents to them so to do. It takes a good business man no time to realize that an architect as a superintendent of construction is an asset and that his commission is money well invested. But few of them realize that in their business buildings the intimate study of fundamental problems of plan and elevation is a dollars and cents investment. He realizes that artistic merit in public buildings is a matter of civic pride, and he realizes that his home is not a commercial proposition and that artistic merit in it is much to be desired. But the business man is coming more to realize that there is a certain money value in the artistic appeal which a building makes to the layman, to the public from whence he draws his customers and upon whom depends his business. The results obtained in this instance reflect credit not any more upon the ability of the architects than on the good judgment and business acumen of the owners of the building.

The problems involved in the design of a mortuary chapel and an undertaking establishment are not often met. Such a building presents a rather peculiar and unique proposition. As a part of the equipment of an undertaking establishment a mortuary chapel is highly desirable, if not quite essential. The chapel is a feature which of necessity



Second Floor Plan



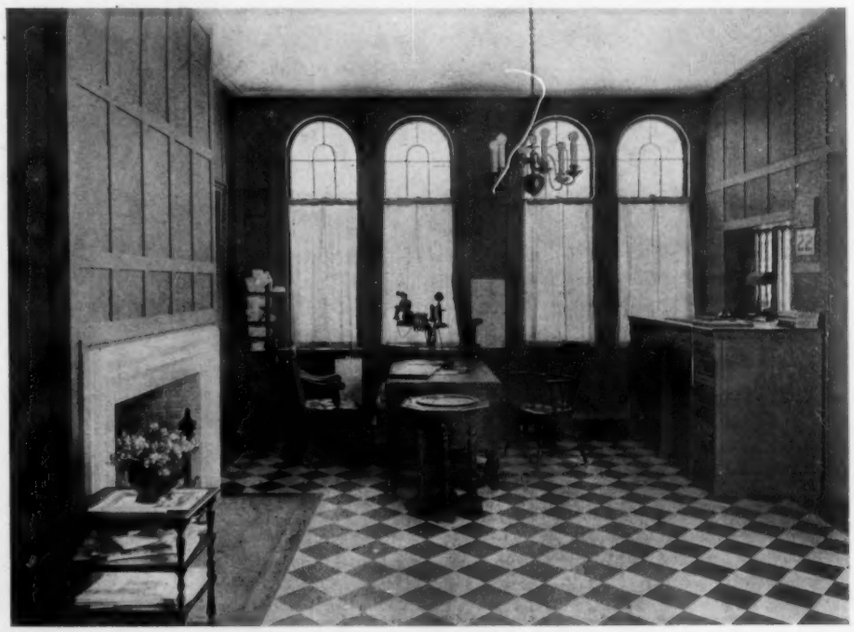
First Floor Plan

Private Reception Room

must not be entirely devoid of a certain amount of sentiment. This need not be discussed at length here, but it is an interesting sidelight upon the relationship between architecture and our social habits and customs. The services held in a mortuary chapel have a certain sanctity, and it is quite fitting that such services, in spite of the sanctity of their nature, should be held in a place less frequented than a modern church. Memories of the incidents and experiences of a funeral service are perhaps less often recalled if they are disassociated from a regularly attended church edifice.

The problem here presented has been solved more strikingly in the new exterior dress which has been put upon the old residences than in any other way. A close analysis of the plan, however, will show that the appeal made by the exterior is very largely the result of logical and successful planning. The expression of the chapel element of the building by the high, simple, nave-like, ecclesiastical mass, with its large plain doorway, rose window and belfry, is supported by the suggestion of an adjoining cloister within which the business offices of the establishment are housed. This adaptation of an interesting north Italian style whose historical associations are largely ecclesiastical is quite appropriate and commendable. The extensive use of brick for architectural detail may have been practised as a measure of economy, but even if so, its simplicity and good proportion are quite acceptable and surely in keeping with the spirit of the style which this building emulates. Such details as the arches of the porte-cochère, where there is an apparent disregard for structural propriety, make the building an interesting study in architectural archeology; for what Italian constructor of the thirteenth or fourteenth century would have hesitated a moment about doing just such a thing as is shown here, where tie rods perform a natural though somewhat illogical function. With reference to plan arrangement, it might be mentioned that this porte-cochère not only forms a protection for the carriage entrance to the chapel, but is a part of the passageway to the garage, which is an important part of the building group in which are housed the motor hearses, limousines, etc.

Of the plan little comment is needed. The placing of the units so that the major chapel is easily accessible from the street, from the porte-



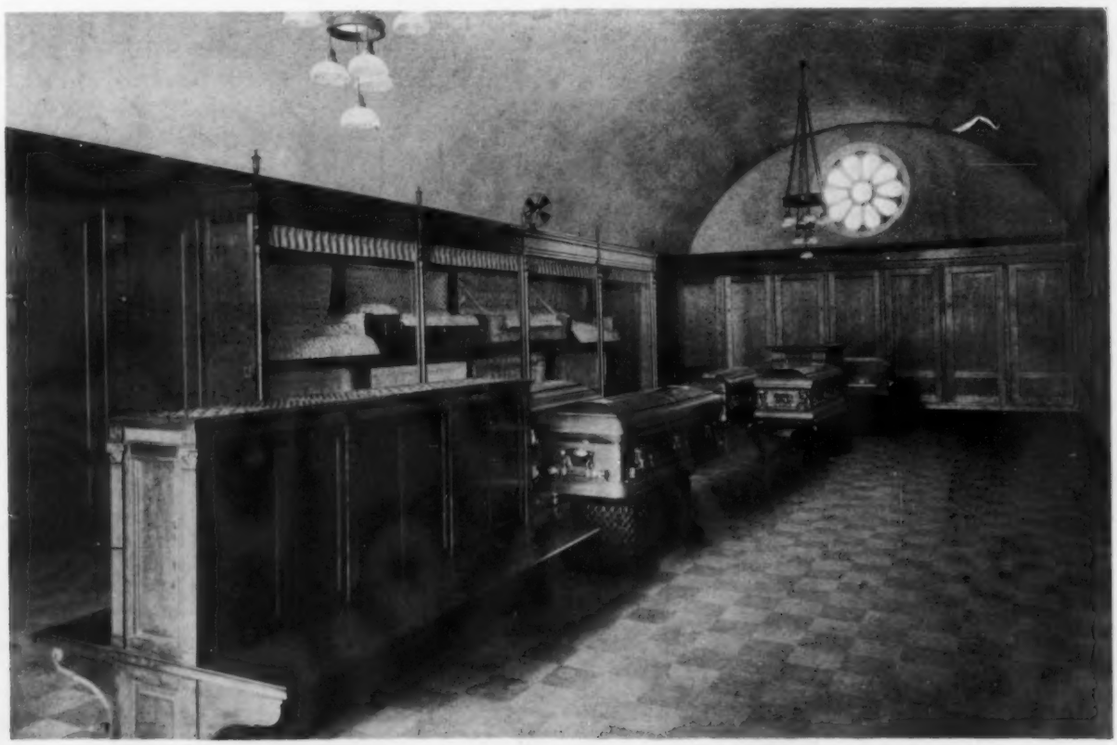
View of Principal Business Office

cochère, from the business offices and from the mortuary and laying-out rooms is a feature of careful planning well worth notice. The major chapel has a seating capacity and is adjoined by a minor chapel seating thirty. It is interesting to note a unique feature in the folding wood panel windows between the minor chapel and the chancel of the major chapel. This has been used quite frequently in the case of public funerals when the immediate family may occupy the minor chapel in complete privacy and still be quite close to the chancel and the services in the major chapel.

In the major chapel the plain, sand-finished walls form an effective foil for the elaborately painted beamed ceiling and the highly ornamented walls of the chancel. The center portion of the decorated panels at the rear of the chancel form a screen behind which is located a pipe organ for use in the chapel. The appointments of the business offices, particularly the two smaller ones, are quite in keeping with the high character of the building.

The most commercial aspect of the building is found in the huge robe and casket display room on the second floor. This room occupies the entire area of the building over the major chapel. Its wall cabinets, extending entirely around the room, form a wainscot feature from which the elliptical barrel-vaulted plaster ceiling springs. The extremely commercial character of the room is relieved by the pairs of high-backed seats which have been devised to cover the huge radiators which occupy conspicuous places on the floor. On the second floor also there is a suite of rooms, where, in cases of emergency, out-of-town relatives may be lodged as at a hotel. This has proven at times a feature of great convenience.

The wood used in the major chapel is oak, as also in the large office and the halls. In the small offices on the first floor, and the display room on the second floor, the wood used is selected birch which has been given a dull polished wax finish over a gray-brown stain. The minor chapel and all the smaller rooms of the building have enameled finish. All walls and ceilings in general are rough sand-finish plaster. The floors of the main office and the halls are of black and white alternating diagonal square tiles. The aisles of the major chapel and the entire floor of the display room are of cork tiles, while the rest of the floors throughout the building are oak, except in the lavatories, baths and mortuary, which are vitrified tile. The materials used throughout the entire building bear close inspection and bespeak the good judgment of the business men who have encouraged and supported their architects in the production of a building which is not only a credit to the architects but a source of satisfaction and a good investment for its owners.



Robe and Casket Display Room, Undertaking Establishment of Schoedinger Co., Columbus, O.
Howell & Thomas, Architects

General Business Conditions as They Reflect on the Building Situation

WE are at a time now of unusual conditions in the business world when it benefits the architect, the builder and all others interested in construction matters to give heed to changing economic conditions and to the greater aspects of the commercial, industrial and financial fields as they may affect the building industry.

A comprehensive survey of the business world shows many points of interest and to a certain extent offers many possibilities for coping with situations which are wholly different from those prevailing before the war. It is apparent that the first wave of prosperity is broken and that we are now on a decline. We know that in considering the volume of industrial earnings in the past three years the promise of the future is not as bright as it has been, even though the gross earnings in 1919 were greater than ever before. In 1917 a higher net profit was shown in spite of the fact that gross earnings were not as great as in 1918 and 1919. The result of this condition has been an increasing demand for production, and as production has meant financing, heavy expansion has taken place, and a vast amount of money has been invested in industrial securities and refinancing projects.

The peak of high prices in most lines is apparently passed, and there is a definite tendency now to bring down prices. The public is now recovering rapidly from its orgy of extravagant expenditure and wild investment, and as a result there is a noticeable tightening in the amount of investment in propositions offering extravagant profit and in the production of luxuries. During the past few months while a great volume of money has been put into necessary building, this has been largely investment of necessity and under duress rather than investment for conservative return.

It is an amazing but understandable fact that any wave of commercial prosperity is usually followed by an equal area of depression. Thus when we know that the unexampled prosperity of the last few years has climbed to a peak and is definitely started on a line of descent, we may be certain that the ensuing period will be one of gradually returning conservatism, both in financial activity and in actual commercial profits, even to the point of reaching a fairly serious business depression.

An equally amazing fact, however, and one of direct interest to the building industry, is that the building industry is the last to benefit by national prosperity and incidentally is by far the last to be adversely affected as the line of industrial and commercial profit decreases. In fact, it would seem on logical analysis that as popular interest in wildcat investment and in various other investments entailing high profits may lessen, so must interest return in conservative investment; and conservative investment may well be translated to mean investment in those forms of production which meet pressing economic needs without undue profit.

There are, as shown in the past, three methods of "holding on to money" on the part of the public when it has been overcome by a wave of conservatism equal to a former wave of extravagance. The first is to put the money into the bank; the second is to cautiously put some of it into sound bonds and low-return investments which offer security and somewhat better than savings-bank interest; and the third is to put money into income-paying real estate.

We have passed the great wave of industrial expansion with its accompanying extravagance; an era of speculation in stocks and unimproved real estate — a time when the subdivider and allotment developer can sell lots as fast as he can map them. We have passed the time of feverish speculation in the increment in values of existing buildings due to the great increase of reproduction costs. We are passing now through a period when savings banks are reporting greater deposits than ever before in the history of the country. As we watch the fluctuating bond market we see that the period of depression is showing signs of breaking, and that the return of the public to a normal speculative basis is obvious. What is more logical to believe than that the third step — that of a return of public confidence in building investment — may be expected soon?

Therefore, those of us in the building industry who may begin to hear comments, even of a slightly discouraging nature, can take heart in that the silver lining of the cloud of decreasing prosperity usually falls to the building industry, and it may be that the line of prosperity for the building industry in general runs somewhat inversely to that of the average industrial interests.

Co-operative Ownership to Meet the Present Shortage of Buildings

I. STANDARDS AND PRACTICE DEVELOPED FROM PAST EXPERIENCE

THE trend in real estate and building activity in the United States to-day is significant in view of the fact that much of this activity is being forced by economic causes into new and practically unused channels. Viewed from a broader aspect, we may consider the increasing demand not only for housing but for rentable building space of all kinds almost as a great volume of water rushing down a natural channel. Suddenly the usual channel has been dammed by a structure, the principal units of which may be considered the high cost of producing building materials, the difficulty of transporting building materials, the high cost of labor in assembling these materials, and the resultant unwillingness of the ordinary financing organizations to provide the necessary funds for building loans and mortgage loans which are necessary in great volume to meet the building demand. As a result, this demand has assumed the proportions of a flood and is naturally seeking new channels.

New Methods of Financing

Thus we find for purposes of financing buildings a great number of new financing corporations which have realized wisely that the only place to get money to meet a public need is from the public. Consequently these corporations have been organized for the purpose of financing both first-mortgage building loans and for partial equity financing, selling to the public so-called first-mortgage gold bonds paying 6 per cent and using this money to make necessary first-mortgage loans; while, for equity financing, actual stock in the companies is sold to numerous small investors. The proceeds of these stock sales are used, as before stated, in partial equity financing, which means that land contracts are discounted; that, in addition to first-mortgage loans, builders are provided with practically all of the necessary funds for carrying out building operations, for which they pay a premium approximating from 15 to 20 per cent of the entire cost of labor and material.

This heavy tax on financing is bearable only where the need is greatest, and that is in the construction of dwellings. Thus we find in the larger cities of the Middle West great sums of money being raised and expended for housing. The tenant or purchaser of the house has been educated to unusual costs and apparently is not discouraged by the additional cost of this type of financing. It would, therefore, seem that this new development in the financing of building operations in the dwelling fields is the most practical solution yet devised for meeting the general housing shortage.

It is but natural, therefore, that in consideration of the heavy cost of materials and labor to which an unusually severe tax is added for financing, that the individuals who actually wish to use the building space thus provided should begin to think along lines which might lead to the provision of the necessary space without paying so much to the wholesaler and the jobber, who in the case of a building operation consists of the speculative builder, the building financier and the building investor.

Principles of Co-operative Ownership

We arrive, then, by a process of natural reasoning to a realization of the application of co-operative ownership, which means simply that instead of a group of unconnected individuals renting portions of a building, a group of persons wishing building space of a certain kind are brought together to pay in rent for an advanced period, thus providing funds to build, and eliminating the speculative and financing profit. The rents which the group of unconnected individuals must pay in a new building are computed to include returns, not only on the high present cost of construction and maintenance, but on the high cost of financing and on an element of profiteering which has been definitely introduced into the speculative real estate field in the last two years.

We may take, for example, the wild speculation in apartment houses which has been carried on in New York City. Here apartment houses have been purchased originally on a basis of six or seven times the annual rental. Immediately rents were raised and the building resold to another speculator or investor. In many cases buildings have been sold seven or eight times in a few months, and the tenants have been forced to pay rents which have been increased sometimes as high as three times the rentals paid during the pre-war period. It is evident that if the first purchaser had been a group of individuals interested in living in the building they could have realized a great saving on rental cost.

As usual, a realization of this possibility has come to the public somewhat too late in New York City; but it is interesting to note that hundreds of existing buildings have recently been placed on the market for sale under a co-operative plan, whereby a tenant purchases his apartment outright, and the building is operated under the usual co-operative

methods as described in later paragraphs. This example may be used to describe one of the unusual channels into which real estate activity is turning; but the more interesting channel of the co-operative building and ownership of new structures constitutes a subject which is worthy of careful consideration on the part of architects, builders and prospective renters of building space of every description.

Large Projects on Co-operative Basis

There can be little doubt that a great volume of building is to be carried out in the next few years on the co-operative ownership basis. As this article is being written information comes from New York that the co-operative method of building has made possible the greatest single real estate transaction ever known in that city. This project involves an expenditure of more than $40,000,000, consisting of an estimated construction cost of $25,000,000 and a 21-year lease of land at a rental of about $15,000,000 with two renewals. A syndicate has been formed including several prominent builders, for the purpose of leasing the two blocks between Park and Vanderbilt avenues from 45th to 47th streets (part of the Grand Central Terminal zone) and constructing thereon two office buildings, one a 31-story building and the other a 25-story building. These buildings will have a total floor area of over 1,500,000 square feet. The entire project is being developed on the co-operative basis, whereby a number of large corporations are taking extensive space through the purchase of stock in the operation.

In various parts of the country new apartment buildings and office buildings are being developed on this co-operative basis, and further analysis will show sound reasoning in the production of the great volume of business to be developed in this manner.

When we reach a condition in the building field such as that which obtains to-day, high cost of building, coupled with the difficulty of financing, eliminates to a great extent the activities of the speculative builder and the realty investor. Thus, if building space is to be provided, we must look to new sources of building funds, and what sources could be more logical than those individuals or corporations for whom the actual use of the new building space is to be provided?

The general principles of co-operative building ownership apply not only to apartment houses but to groups of individual dwellings, to office buildings, loft buildings and all forms of rentable space for which there exists a popular or general demand. We can, therefore, analyze co-operative building ownership in its application to apartment buildings and from this analysis gain the desired information regarding similar financing of other types of buildings.

Application to Apartment Houses

The co-operative ownership of apartment buildings is not a new idea. In fact, it originated long ago in European countries and became particularly popular in Germany and in France. At sporadic intervals co-operative building was attempted in this country; but in the early years of this activity it usually failed because of the lack of proper organization and because the operation was based too strongly on congeniality and the human equation. Gradually, however, apartment buildings were developed, particularly in New York City, so that during the last two decades hundreds of such buildings were built and financed and have been successfully operated to such an extent that they have caused little comment, until at this time of increased interest in the co-operative idea a more careful analysis of what has gone before is being developed. We can, therefore, for the purpose of analyzing this question of copartnership building in its application to present-day conditions, benefit considerably by a study of experiments of the past, and of certain standards which have been developed as the result of successful experimentation, while warnings will be sounded as we may meet conditions which in the past tended toward failure.

On investigation we find that forty or fifty years ago apartment buildings, particularly of the studio type, were developed in New York City and have been operated successfully on the co-operative basis ever since, one building being of particular interest in that it still has tenants who were original purchasers in the stock of the building. The principle of co-operative ownership has been described by an organization which entered this field many years ago in the following manner:

"A man buys a double house paying about one-third the price in cash and leaving the balance on mortgage. He lives in one-half of the property and rents the other half, and the income from the rented half pays the interest on the mortgage, taxes, insurance and all the other expenses of the whole. Thus he gets rent free in the place he lives in."

This in a sense is the essence of the plan. In applying this plan to an apartment building it is evident that this idea must be developed in view of a number of additional and contributing factors. In the first place there must be an association of individual owners who provide the necessary financing to meet the equity cost of the building. Space in the building is provided for these owners,

but additional space must be provided for renting purposes in order that the income from the rented section of the building will meet the ordinary running expenses, leaving the owners' rent free.

Details of Typical Operation

Thus, a group of individuals may form a stock company and purchase enough land for a building. They obtain a building on permanent mortgage, making it unnecessary for them to put up in cash more than 40 per cent of the cost of the operation. When the building is completed each of the stockholders owns jointly with his associates the equity in the building. Each is his own landlord, as his ownership carries the right to the occupancy of a certain number of square feet in the building, this apartment being under a perpetual proprietary lease. As long as the rentable space is properly balanced to carry the cost of running the building, the co-operative owner is not called upon to pay any rent on his apartment unless there is a deficiency in the income from the rented part of the building. If there is a deficiency, this is, of course, chargeable as an owner's rent.

It has been generally experienced in successfully operated co-operative apartment buildings that a surplus accumulates from the income of the rented space which has been used to gradually decrease mortgages. It is a significant fact that may be noted here, that there has been to the writer's knowledge only one foreclosure of mortgage on any co-operative building in New York.

The co-operative owner has an apartment designed to meet his individual needs, and he often has more floor space and a more conveniently appointed home than if he spent an equal amount of money in purchasing an individual dwelling, particularly in expensive residential areas. He also avoids the direct responsibility of utilitarian management, and at the same time by the investment of a sum of money enjoys freedom from rent, taxes and the other costs incident to the direct ownership of an individual property.

Referring to brief figures on the average co-operative apartment building which has been successful in New York, let us take, for instance, one building in which the cost of land and building was $1,000,000, and we find the plan has worked out as follows:

Cost of land and building, say	$1,000,000
Mortgage, at 5 per cent	600,000
Equity	$400,000

Represented by 4,000 shares par value of $100.

The building contains 12 suites of duplex studio apartments of 10 rooms each, with 3 baths; 24 suites of 4 rooms and bath; 12 single-story studios, with anteroom and toilet, and a large picture gallery.

The income would be approximately as follows:

12 duplex suites at $6,000		$72,000
24 small suites at $1,750		42,000
12 single studios at $1,000		12,000
Gross income		$126,000
Fixed charges and running expenses:		
Interest	$30,000	
Taxes, say	12,000	
Expense account	8,400	$50,400
Net income		$75,600

So that ten subscribers having taken the $400,000 of stock in equal shares, and each occupying his duplex apartment, gets rent, heat and water supply free, and a surplus of $75,600 is turned into the sinking fund to help toward paying off the mortgage.

Three Methods of Financing

The method of carrying out a co-operative ownership project as described above is one of three methods, all of which have proven more or less successful in the past.

I. The formation of a stock company to provide the necessary equity. This is the plan heretofore described in which about 40 per cent of the building space was occupied by owners and 60 per cent made available for renting purposes, the rental income being used to defray expenses on the entire building.

II. Another plan which has been used successfully for the development of small buildings has been what is called the straight co-operative building ownership. In this plan a stock company is formed and the entire space is occupied by owners. For instance, if 10 individuals formed a stock company, a building was built containing 10 apartments, and the actual ownership of each apartment was vested in an individual who contributed to the purchase of stock. This plan had the advantage of a less involved financing operation, and the building was operated by a committee of tenants. Each apartment owner paid an annual owner's rent of an amount so figured that the total rental would equal the approximate renting cost. At the end of a year a deficiency payment was required or a rebate given, depending on whether or not the cost of maintenance overran the total of owners' rentals. This is a simple plan which has proven successful in bringing all the benefits of ownership to the individual apartment tenant.

III. A third plan which has been successfully used is a combination of the two plans above outlined. This involves the formation of a stock company, the provision of rentable space, but also charges an equal rent to the apartment owner. At the end of each year's operation the profits of the building were divided and rebated in cash to the stockholders, thus accomplishing in effect the

same condition as in the first plan discussed.

A further development of this plan was to charge the market rental on the rentable space and to charge owner's rental (usually estimated at one-third the market rate) on each apartment owned by a stockholder under perpetual lease. Thus sufficient funds were collected to insure always the deficiency payment, and the surplus has been used for reducing the amount of mortgage.

A Banker's Opinion of the Plan

Some years ago, when interest was somewhat keen in the co-operative apartment idea, an experienced banker was asked his opinion of co-operative stock and building ownership. Following is his statement:

"There have been owners who in some cases were under the delusion that they would get 'something for nothing' and others who did not apply ordinary judgment to the choice of their investments. These have met with disappointment. On the other hand, a large number of families are now living in co-operative buildings in New York owning their homes, and effecting very satisfactory economies in the item of rent.

"The best results are attained when the owner of an apartment actually lives in it. For when he fills it with an outside tenant he is reducing the possible income of the building as a whole, and maybe the direct cause of a vacancy among the apartments of the building which were intended for renting to the public.

"It sometimes becomes necessary, however, for an owner to rent his apartment. There are such cases where the owner has averaged a net cash yield on his investment, during a period of from three to twenty-five years, or from 7 per cent to 17 per cent.

"A skilful investor raises the following question when an offering is made to him:

"1. Is there ample security behind the investment?

"2. Is the yield high enough; is there a fair return on the money invested?

"3. Has the investment marketability; that is, can it be sold at a reasonable price in case of necessity?

"An investor who has in mind the 'fourth dimension of investing,' asks also —

"4. Has it the possibility of enhancement in value?

"Now, when you, as a small capitalist, are invited to buy an apartment in a co-operative building you should satisfy yourself on these four points, and, as we shall see, on one other.

"1. You must be sure that you are buying a really valuable share of the equity in the building. If the co-operative company has paid to its promoters an exorbitant fee; if the land has been purchased or is to be purchased at a price fixed by the seller and not by the law of supply and demand; if the building contract is to be let on a non-competitive basis, then it is likely that the equity, when thoroughly analyzed, will turn out to be startlingly small.

"2. The return on the investment should be estimated on a rainy Friday when your health is bad. Make an allowance for empty apartments, repairs, interest, bad debts, etc., which is in accord with the experience of real estate brokers skilled in apartment work. See that there are in the co-operative group the makings of a competent and hard-working house committee, and that the real estate agents for the building know how to manage as well as rent an apartment building. Be sure that the articles of incorporation and the entire business plan are approved by a lawyer thoroughly familiar with such properties. Satisfy yourself that the architect is an expert in utilizing space in a city apartment. Inquire the annual expenses you may be under, whether they are called assessments, proprietary rentals or plain rent. Be careful not to buy an apartment twice or three times as desirable as the one that you now, on the same income, can afford to live in.

"3. If you can show an attractive statement of the profits of your apartment when rented, you should be able to sell it at a fair price. But such an investment, however good, should be classed among your 'slow' investments. The writer's opinion is that when the desirability of co-operative apartments is better understood they will command a satisfactory market. There have been numerous cases where owners have sold at a profit.

"4. 'The fourth dimension of investing' applied to this problem would take this form: If the apartment property is to enhance in value it should be located where the rising tide of realty values will lift it to new levels. Here is where your real estate brokers, if experienced, can be of great service. Your own study of the trend of residence sections may also throw light on the subject. It is sometimes advisable to call in one of the great realty consultants on the case.

"The architect, if he has professional skill, may also look to the future by designing the building in such a way that it may later be used, in case the neighborhood changes, for commercial purposes.

"There is a fifth consideration of great importance—the personnel of your prospective associates in a co-operative apartment. You are making an important investment and choosing a city residence for a long period of years. You are also virtually going into partnership with the group of co-

operative owners. It is of vital importance that, besides having business ability, they should speak the same language. With this point properly covered and the other four tests of a good investment applied, you should be able to make a wise choice of a co-operative apartment. And if you do, you will have disposed for yourself and your family of the largest item in the cost-of-living problem."

Does Not Give "Something for Nothing"

Too much stress cannot be laid on the point made in the above commentary relative to getting "something for nothing." While the average co-operative plan is featured as a rent-free proposition and is in effect rent free, it must be realized that a considerable cash investment has been made, and that the interest on this investment is chargeable as rent. The actual effect of such an investment is that of obtaining attractive living quarters at a very low rental. At the same time it has been possible for individuals to choose their neighbors, in view of the fact that the original group of investors must naturally have been of a congenial nature, and that in the average co-operative project of past years agreements have been entered into whereby if an owner wished to dispose of an apartment he must offer the stock to the other owners in the building; or must receive approval of the new purchaser by an owners' committee.

Some errors were naturally made in developing protection on too high a basis. For instance, in one co-operative apartment-house project it was agreed that no owner would sell an apartment except with the unanimous consent of the other owners. As years passed the section grew undesirable for residential purposes, and one owner after another wished to move and accordingly wished to dispose of his apartment. It happened that one apartment was owned by two spinsters who had very decided ideas against moving and could never be induced to give their consent to the sale of apartments. Thus it happened that this building gradually became vacant, and no apartments could be transferred until death finally removed the main objectors.

Conditions that Govern Success

It must, of course, be realized that with the advanced cost of building and changed conditions in financing, a co-operative building project is not the same problem as it has been in the past; and that the rules in the past serve more as guides than standards to be applied to-day.

In the following issue of THE ARCHITECTURAL FORUM a general outline will be given of what seems to be the more advanced thought and decision regarding the financing and maintenance of co-operatively owned buildings. Before entering, therefore, into a detailed consideration of practical methods of to-day, we may review the suggestions of the past as a basis on which to develop constructive thought for the future. Past experience shows:

1. That the best organizer of a co-operative venture is an interested individual — either an architect, a builder, a stock salesman or a real estate broker.

2. That the best manner to organize has been for a group of individuals to develop a prospectus of the operation, having sketch plans of the building drawn, and obtaining a tentative agreement from a loaning institution as to the amount of mortgage obtainable. At this time a stock company is formed capitalized for an amount equal to the necessary equity in land and building, with the stock all common and non-assessable.

3. That definite decision be made as to the amount of rentable space; and a general rule has been developed that the percentage of rentable space in a building should be approximately equal to the ratio of the first mortgage obtainable against the total necessary investment. Thus where a first mortgage of 60 per cent of the cost of operation has been obtained, approximately 60 per cent of the available space for renting should be rentable at market values to non-owners; the balance of 40 per cent of space then to be divided among the owners in square feet according to the amount of stock subscription.

4. That all details of management and operation be placed in the hands of a dependable real estate management organization, and the general details of this arrangement and all matters pertaining to the business of the building be handled by a small committee of stockholders, consisting of a board of directors of the corporation.

5. That a definite owner's rental be established and collected, in order that in addition to the total income from rented space there be an income from the owner's space which is sufficient to offset any deficiency and to provide a sinking fund for mortgage retirement. In this manner the owner pays an average of one-third the market value in rental, and his rental saving represents good interest on the amount of money invested. At the same time if land is improving in value and mortgage is being reduced, his stock is growing in value.

6. That the owners of such a building be of congenial type, sufficiently broadminded to operate in harmony, and that restrictions on the introduction of new ownership be sufficient to maintain an agreeable relationship, but at the same time not so stringent that an *impasse* may be created from a business viewpoint.

Italian Renaissance Details

A COLLECTION OF MEASURED DRAWINGS BY WM. D. FOSTER

THE doorway to the church of S. Maria delle Grazie at Brescia is not only very pleasing in proportion but is quite remarkable for the excellence of its detail.

The arabesques on the pilasters and the ornament on the colonnettes are remarkably fine. The carving shows the tool marks quite distinctly, the sharpness of the work giving an appearance almost as of wood carving. The general color is a creamish white, which is relieved by the inserts of colored marbles in the lozenge-shaped spaces in the arabesques; the base moulding is also of a bluish marble, while the two lions of an earlier period are of Sienna marble.

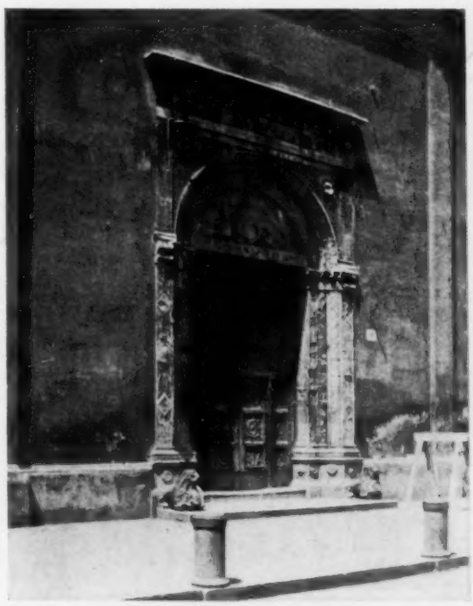
The wooden doors are also very beautifully carved and ornamented with bronze buttons on the stiles and rails. The carving here as on the marble is very sharp and well preserved. Stained dark, the doors give the appearance of being of bronze rather than of wood.

This doorway probably is of an earlier date than the church which was built in 1522. It is practically the only spot on a very plain and uninteresting stucco façade.

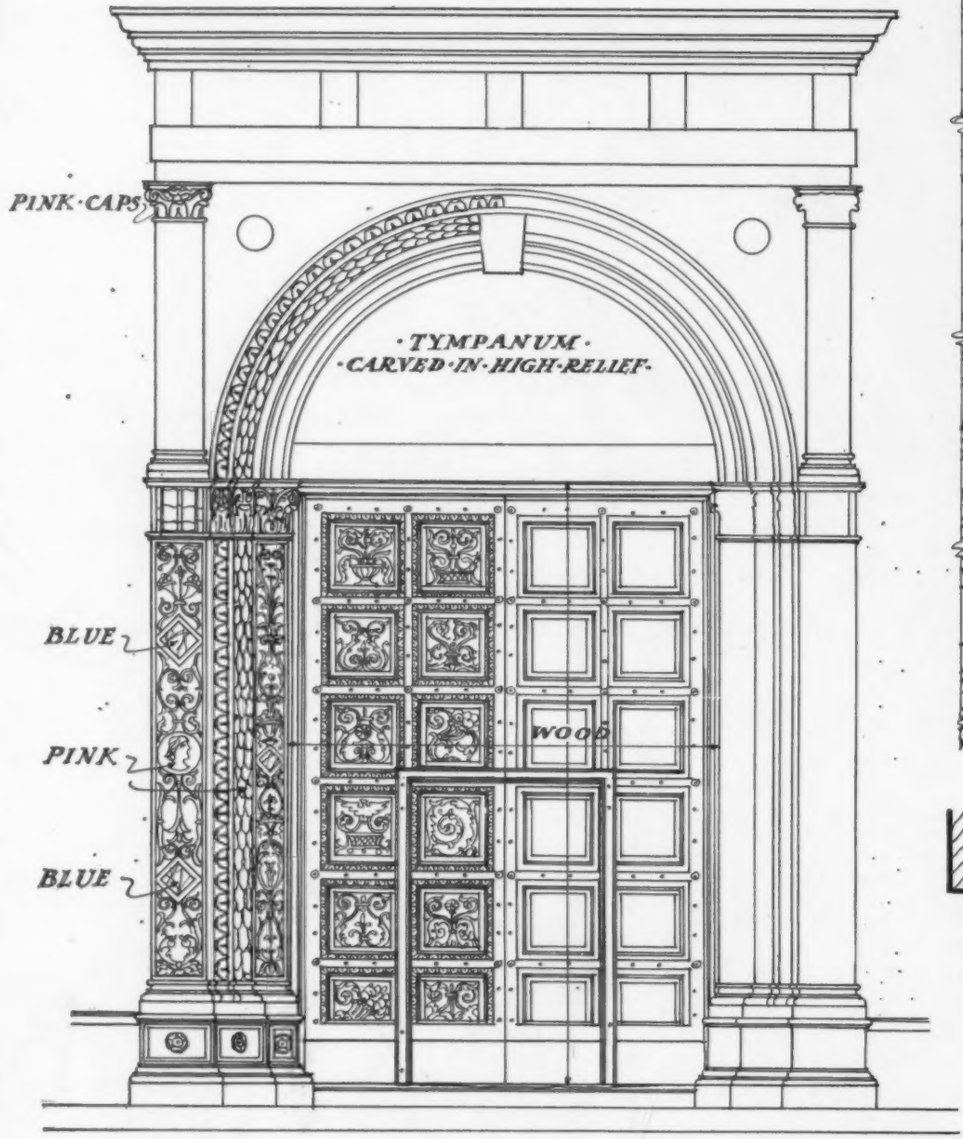
The iron grille is part of the enclosure of a small corner loggia of a building in Florence known as "L'Arte delle Lana," on the Via Calmara and exactly next to Or San Michele. It is typical of many similar grilles or gates in various parts of central Italy.

The frame and dividing bars are particularly interesting, being built up of simple strips of iron so as to give a very rich effect. It is now the entrance to a florist's shop which occupies the ground floor of the building.

The garden of the Villa d'Este at Tivoli is one of the most interesting in Italy. Due to its location on the side of a hill and the consequent fall of water, the garden is filled with "water motifs," pools, fountains, "water organs" and the unusual balustrade of fountains shown here. These fountains flank either side of the two secondary flights of steps in the central part of the garden. The width of the steps is about 14 feet and the flight is about 50 feet long, that is, there are seven divisions, similar to the one which is shown in the measured drawing on page 247.

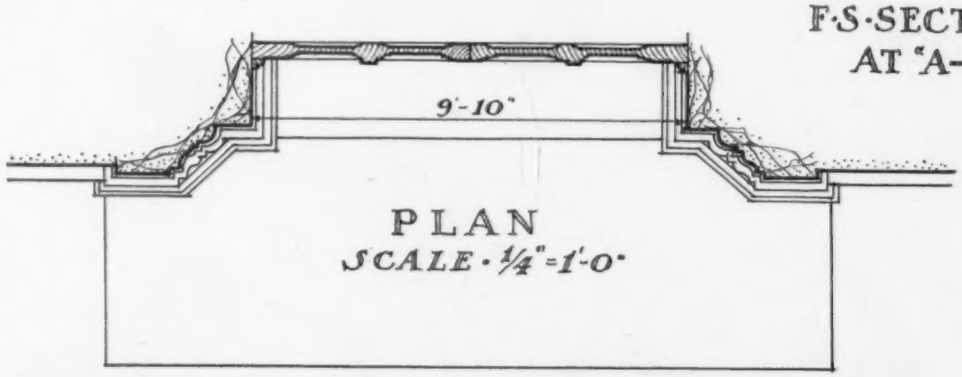


Portion of Façade and Detail of Doorway, Church of S. Maria delle Grazie at Brescia



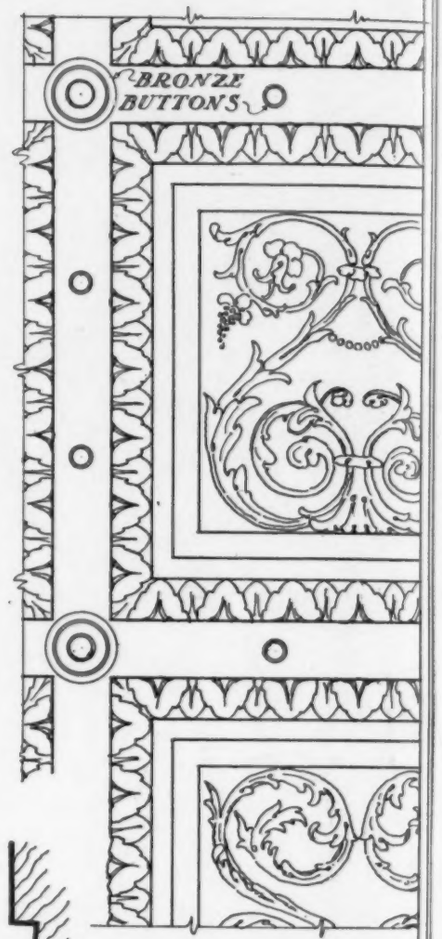
ELEVATION

·WHITE·MARBLE·EXCEPT·WHERE·NOTED·



PLAN

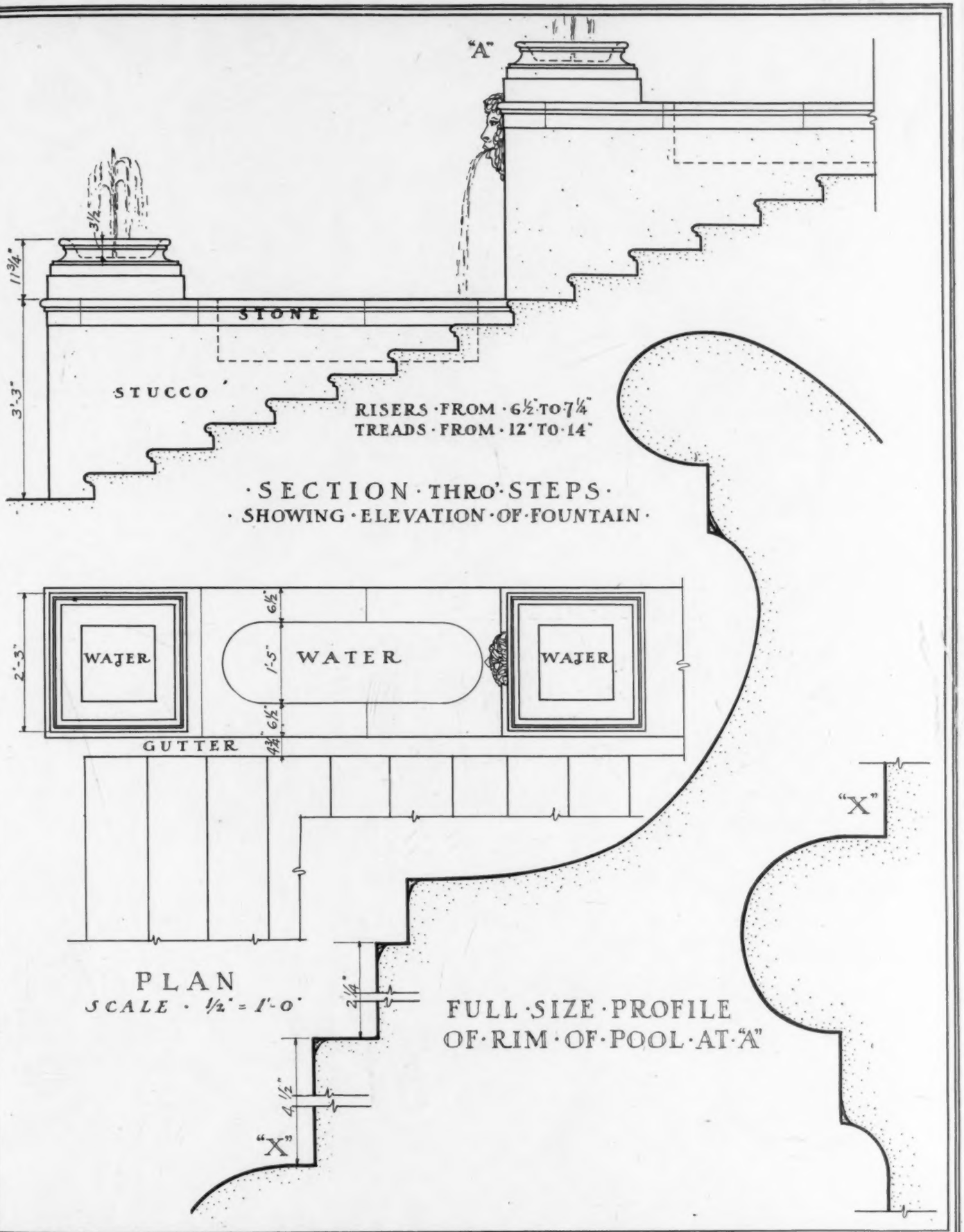
SCALE·¼"=1'-0"



1½" SCALE DETAIL·OF WOOD·DOOR

F·S·SECTION AT "A-A"

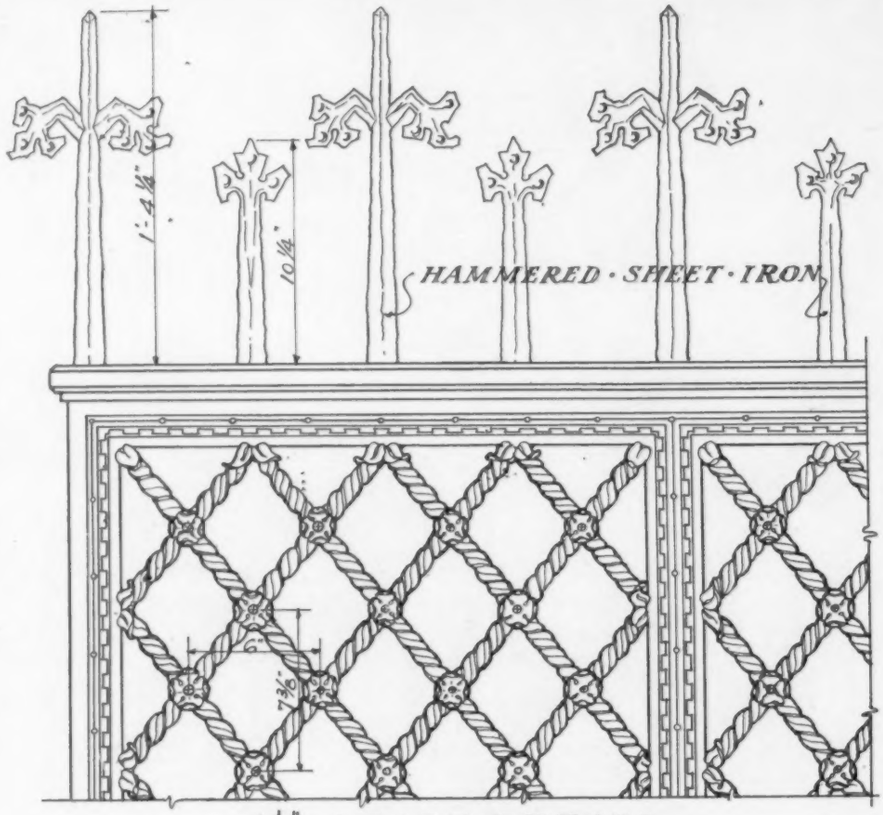
ITALIAN DETAILS 1920	·DOORWAY· ·S·M·DELLE·GRAZIE·BRESCIA·	MEASURED and DRAWN by WM·D·FOSTER



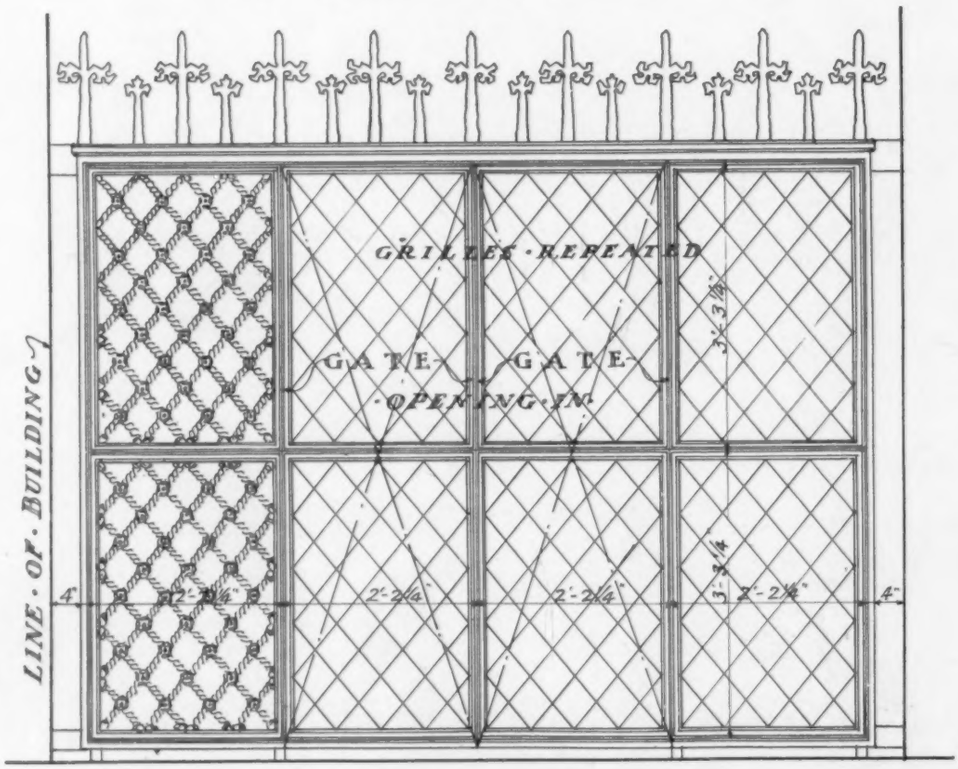
ITALIAN DETAILS 1920

"BALUSTRADE" · FOUNTAINS · · GARDEN · OF · THE · VILLA · D'ESTE ·

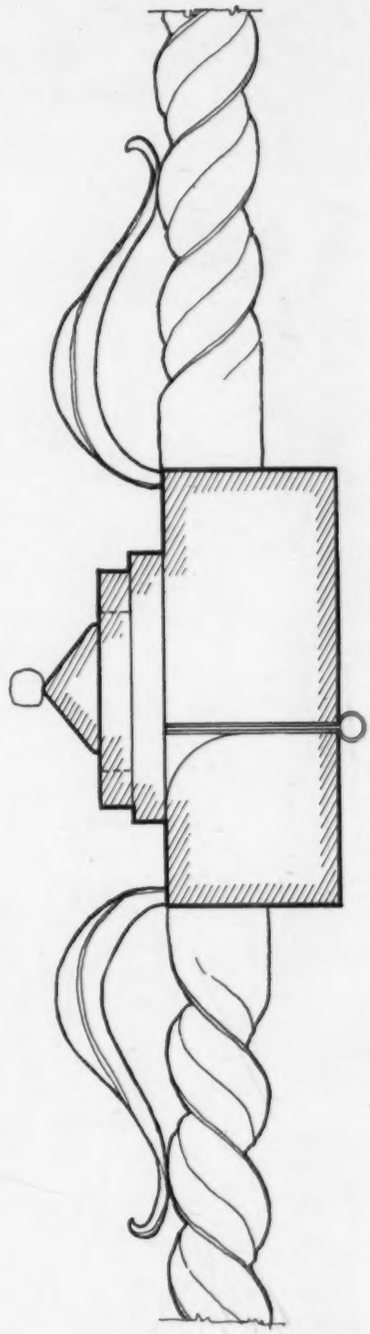
MEASURED and DRAWN by WM · D · FOSTER



· 1½" · SCALE · DETAIL ·



ELEVATION
SCALE · ½"-1'-0"



F · S · DETAIL · OF · MEETING · RAIL · AND · BAR

ITALIAN DETAILS 1920

· IRON · GRILLE · AND · GATES · L'ARTE · DELLA · LANA · FLORENCE ·

MEASURED and DRAWN by WM · D · FOSTER

Architectural Acoustics

RECENT TESTS AT THE UNIVERSITY OF ILLINOIS INDICATE THE SOUND-PROOFING EFFICIENCY OF THIN METAL LATH AND PLASTER PARTITIONS

JUST as the watch through the ages has been evolved from a bulky timepiece of mammoth proportions to the thin, beautiful models of the present day, the building partition has been skeletonized from the heavy ponderous walls of the Middle Ages to the space-saving partition of modern engineering efficiency. While the thin watch was developed because of excessive weight and unattractiveness of the older style, the 2-foot wall of centuries ago has been decreased to one-twelfth of that thickness by the demands of the present era.

An essential in determining the choice of partition types is the relative degrees of sound-proofness, and while certain theories that have developed from the results of practical experience have been used as guides, the tests recently conducted at the University of Illinois offer architects a careful and scientific analysis of the subject that promises greater certainty of satisfactory results.

The solid metal lath partition 2 inches thick has for many years been a recognized factor in all insulations where economy of floor space was vital. The choice of this type particularly for its acoustic advantages has not been so general, for the transmission of sound through a thin wall is the point on which some few architects have felt a bit of hesitancy. It has been known, of course, since the inception of the solid metal lath partition, that ordinary measurements by the ear indicated that but little sound could pass. Comparisons, however, of the exact amount of sound passing through the walls in relation to that passing through thicker types of partitions were impossible to determine, due to the unreliability of the ear in measuring these quantities and the varying conditions naturally encountered in different buildings which made anything but a scientific comparison of no value. Hence, the architect has sometimes been guided by arguments based upon incorrect theory and scientific untruth. To get accurate results meant the exploration of unknown fields. The results of the tests recently completed by Prof. F. R. Watson of the University of Illinois proved the incorrectness of former ideas relating to the sound-proof qualities of partitions, and a detailed discussion is presented herewith because of the importance and interest attached to the subject.

Waste space in times past, little considered, has become of extreme value because of the present high cost of building. Comparing 2-inch solid partitions with 3-inch blocks plastered ½ inch on each side, there is a saving of floor space of 3,500 square feet in a typical 500-room hotel. This saving is equivalent to about 10 rooms, with a rental value of at least $50 per day. This extra economy is equivalent to about $18,000 per year, or 6 per cent interest on over $300,000. This is practically all profit.

If the acoustic properties compared favorably with the 3- or 4-inch partitions, the problem would be solved. Up to a few years ago only the fundamentals of sound transmission were known to men who had spent years in investigation. It was generally accepted that the acoustics in theaters depended on hangings, on the curve of the proscenium, etc., and it had already been determined that even a veil or fine meshed curtain would effect a notable difference in the ability of partitions to impede sound. Very little accurate information had been obtained, and Professor Watson's results will, therefore, be of benefit in establishing standards of practice on the sound insulation of partitions.

With but three or four fundamentals similar to those cited above, Professor Watson started investigations in November, 1918. Many months were spent in perfecting instruments which would positively measure the various amounts of sound which came through the walls. The Rayleigh resonator, adjusted to a sensitivity calculated to be capable of measuring the minuteness of the sound transmitted through various partitions, was the instrument finally adopted. It consisted of a brass tube in which was suspended, by a quartz thread, a mirror which moved at an angle relative to the intensity of the sound entering the brass tube. The amount of deviation caused a spot of light to move on a scale, and thus, by means of mathematical calculation, the exact amount of sound could be determined independently of the ear. The delicacy of the instrument may be appreciated when it is known that it will respond to a force that would require four hundred and sixty-five years to raise a sheet of writing paper one foot in the air. The resonator was of the same order of sensitiveness as the human ear, thus giving a reliable instrumental substitute for the latter, since the ear is untrustworthy for quantitative measurements of the intensity of sound.

Because of the different kinds of partitions which were to undergo tests, standardization was the

key necessary to the accuracy of results. The equipment for the test was worked out in detail beforehand, so that no change in conditions was necessary.

The experiments were conducted in two basement rooms separated by two isolated 9-inch brick walls, the ceiling and floors being of concrete, the latter supporting a wooden floor. The double wall between the rooms was cut through and the plaster partition under test was built in this space solidly. In order to keep the sound absolutely constant, a modified organ pipe was especially designed for the test. It was adjusted to give a pitch of one octave above middle C, and was blown by air from a standard pressure tank. This sound is of the quality and pitch usually found in inhabited buildings. The mouth of the organ pipe was located at the focus of a reflector, so that practically all of the sound was directed toward the partition under test. In this way an effect was obtained similar to that resulting from a searchlight.

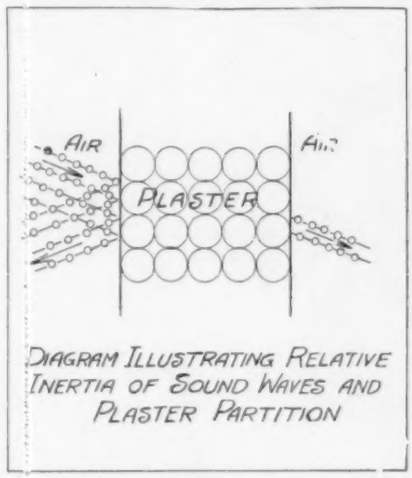


DIAGRAM ILLUSTRATING RELATIVE INERTIA OF SOUND WAVES AND PLASTER PARTITION

Diagram 1

In order that the bulk of the sound be directed against the partition under test, the reflected sound was largely absorbed by padding. So careful and intricate was the work that it required about two years from the first study of the problem to perfect the apparatus and complete the test.

Four distinct tests were successfully carried to completion, comparative measurements on the amount of sound passing through partitions of successive thicknesses of plaster covering and of the following constructions:

1. So-called "hollow partition" plastered on both sides with blocks as manufactured.
2. Same blocks with all holes filled with the same material out of which the blocks were made.
3. Solid plaster partition with metal lath core.
4. Solid plaster partition with plaster board core.

The partitions were erected by expert journeymen mechanics according to the usual practical methods. The same plaster was used on all samples.

A preliminary test of a thin coating of gypsum plaster on one side only of metal lath indicated a degree of insulating value of the plaster equivalent to ten layers of outing flannel. When the plaster coat was increased to one-half inch in thickness the resonator showed a deflection about one-sixth as great as for the thinnest coating. The later experiments were to determine the most efficient thickness of plaster partitions and to learn the relative effects of different partition cores.

Block Partitions. Block partitions have been widely used for a number of years. These blocks have air spaces in them which have been looked upon as aids in securing sound proofness. From a scientific standpoint dead-air space is an efficient sound deadener, but in these blocks the air spaces are not continuous; they are broken by connecting links of the block material, and in the tests under discussion the results show that the bridged openings are a detriment to sound proofing rather than a help.

Tests were conducted with the usual 3-inch plaster block partition, plastered both sides, and also with a partition built with similar blocks with the hollow spaces filled with the same material from which the blocks were made and plastered both sides as in the previous instance. The results obtained by the instrument reading were as follows:

Three-inch plaster block partition, plastered on both sides and with holes filled in with plaster — relative intensity of transmitted sound 1.16.

Three-inch plaster block partition, plastered on both sides, with holes left as manufactured — relative intensity of transmitted sound 3.85.

Solid Partitions. The foregoing tests proved the greater efficiency of solid partitions over those with hollow bridged spaces. The later tests considered two types of solid partitions, one with a metal lath core and the other with a plaster board core. Both partitions were tested after plaster coats had been successively applied till the thickness of each partition was 2 inches. The results of this comparative test showed the following:

Solid metal lath and plaster partition — relative intensity of transmitted sound 0.93.

Plaster board and plaster partition — relative intensity of transmitted sound 2.33.

In all engineering problems there is a size greater than which it is not economy to build. For many years it has been customary to make solid metal lath partition 2 inches thick; there was no scientific or theoretical structural reason for this thickness — it was the result of practical experience. One purpose of the test was, therefore, to determine scientifically the minimum thickness of plas-

ter partitions at which sound proof efficiency was reached. This was determined by starting the readings of the transmission of sound with the thinnest layer of plaster possible to lay on the metal lath and plaster board which constituted the respective cores of the two types of partition used for this particular test. The plaster was put on in successive coats until a total thickness of 2½ inches was reached for each of the partitions.

At about 2 inches in thickness it was apparent that the metal lath partition had fully developed the efficiency of the plaster. The plaster board partition, on the other hand, at 2½ inches thick did not show as effective sound insulation as the metal lath partition at 1⅝ inches.

The readings indicate that sufficient sound deadening qualities are had with a plaster partition with metal lath core at a thickness of 1½ inches. The full efficiency of the plaster is had at 2 inches, and for structural reasons, particularly on long and high partitions, it would seem desirable to maintain the 2-inch thickness as standard.

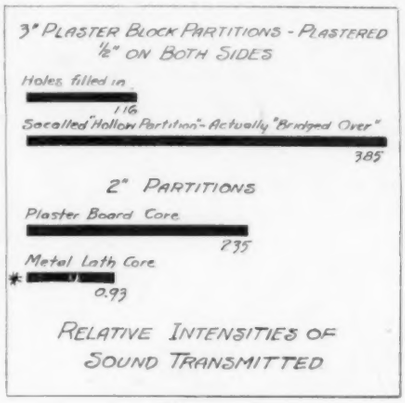


Diagram 2

Professor Watson finds several reasons for the insulating value of the solid metal lath partition. To explain the results obtained through his scientific experiments we quote directly from his report:

"The superiority of the metal lath and plaster partition is doubtless due to several qualities. The metal lath core, because of its open mesh, not only allows the construction of a homogeneous plaster medium that is continuous from one face through the metal lath to the opposite face, but it also reinforces the partition. It has, therefore, the desirable quality of inertia with increased rigidity.

"The superiority of the plaster block partition with plaster filled air holes over a similar partition with open air spaces would appear to be due to increased weight or inertia. Both of these partitions appear at a disadvantage because of the lack of homogeneous structure. Buttering the joints with plaster, particularly at the ends of the blocks, does not always insure continuity of plaster and thus leaves possible cracks or channels through which sound may pass. This would also tend to weaken the partition compared with one in which the joints were completely filled.

"Other conclusions might be set forth, but the illustrations cited are sufficient to show the degree of concordance between theory and experiment."

The theory of sound waves and their transmission through different media on which the tests were based is explained by the following quotations from Professor Watson's report:

"Sound of a definite pitch consists of a regular series of alternate pressures and rarefactions that travel out from the source in spherical waves, each particle in the path of the sound moving back and forth with an oscillating motion. On meeting a second medium, the regular progression of the waves is disturbed. Part of the energy is thrown back in the form of reflected waves and part transmitted, the relative amounts depending on the change in elasticity and density of the second medium compared with the first.

"According to this conception, sound generated in a room may be transmitted elsewhere in a building in several ways:

"1. It may progress with considerable ease in the continuous air passage of a ventilator pipe, or through open doors and halls without encountering a new medium to reflect it. A similar transmission with diminished intensity may take place through threshold openings and partition cracks.

"2. Sound in a room may be transmitted through the partitions of a room, but with more or less difficulty, depending on the qualities of the structure. Thus the *inertia* of a partition plays an important part. On striking the heavy partition particles, the air particles of small weight are thrown back in much the same way that a tennis ball would be on striking a cannon ball.

"The partition particles are moved back and forth slightly by the incident pressures and rarefactions so that sound waves, greatly diminished, progress through the partition. Since the latter is thin compared with the wave length of the sound, all the particles in it may be thought of as moving simultaneously in the same direction; that is, the partition may be considered to move back and forth as a unit. This motion is carried to the air on the further side where diminished waves are set up that constitute a faint sound.

"In case the partition is limited in extent and fastened at the edges, as it must be in any form of partition construction, the sound pressures must overcome not only the inertia of the plaster but also its *rigidity* or its resistance to being distorted. A sound pressure applied perpendicularly to the surface causes a minute displacement, which is greatest at the center and zero at the edges, so that

the partition becomes slightly bulged with a small increase in area. The less a wall gives under such a force, the more efficiently will it stop sound. It should be remembered in this connection that the pressures due to sound are not static but are rapidly alternating pressures and rarefactions of very small amplitude. The displacement of the partition is so small for usual sounds as to be invisible to the unaided eye.

"Another factor affecting the transmission of sound through a partition is the character of the structure. A thick, homogeneous structure has the advantages of greater inertia and rigidity compared with a thin partition. The use of an air space completely separating two members of a double partition would have a marked action on sound and would stop, according to theory, many times more sound than a single partition whose thickness equals the sum of the thickness of the two members of the double partition. This is due to the abrupt change in elasticity and density from the plaster to air and *vice versa* from air to plaster as the sound strikes the second member. In case the air space is bridged over, as is usual in practical constructions at the ceiling and floor and at other points, this theoretical efficiency is greatly diminished because the vibrations travel easily along the paths afforded by the continuity of solid materials. The bridged-over partition thus should be considered as a unit and its efficiency in stopping sound judged mainly on its weight and rigidity.

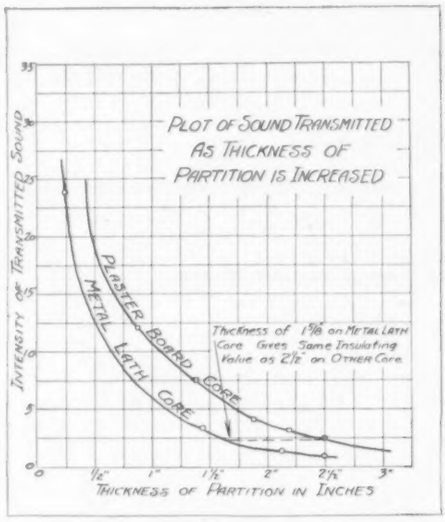


Diagram 3

"The core of a partition is another feature of structure that affects the transmission. It may be of such a nature as to increase the strength of the partition, or it may be simply the central part of a homogeneous medium, or it may be considered as separating the partition in two parts so that the structure is weaker than a homogeneous unit. A partition with increased strength due to the core, such as steel reinforcement, would be more rigid in stopping sound pressures than an equally thick homogeneous partition. The homogeneous partition in turn would be more efficient in stopping sound than the double partition weakened by the core. The latter, however, has some possible advantage in reflecting sound because of the change in elasticity and density in the core. An extreme illustration of this kind would be the case where the core was made of hairfelt so that the action in stopping sound would be analogous to an air space. If the core consisted of a sheet of thick paper, making a continuous contact with plaster on both sides with no air space, this efficiency would be largely lost and the small gain due to reflected sound would appear to be overcome by the loss in rigidity of the structure.

"Finally, the transmission of sound depends on the vibrations of the partition which acts in this regard like a thick elastic plate. The rapidly alternating pressures and rarefactions of the sound waves set the partition in minute motion and thus create corresponding pressures and rarefactions (sound waves) on the further side of the partition. The effect is intensified and the transmitted sound increased in volume if the natural period of the partition is in tune with the sound waves. The vibrations are usually small for ordinary sounds and partitions probably not exceeding 1/100 of an inch in amplitude. They decrease in intensity in walls of greater rigidity, other factors being the same.

"Theory and experiment both show that the transmission of sound through partitions is a complex phenomenon depending upon a number of factors such as inertia, rigidity, structure and vibration. It is difficult to draw comparisons from theoretical considerations for partitions that vary in several factors because the theory is admittedly incomplete.

"Experimental measurements in a situation of this kind appear to give the most direct evidence so that the results recorded here may be taken to represent the relative merits of the partitions."

The Automobile and the Private Estate

PART III. THE DESIGNS OF DRIVEWAYS AND FORECOURTS

By TYLER STEWART ROGERS

THE design of entrance driveways and roads for private estates has not been materially altered by the introduction of automobile traffic. The primary modifications are greater width and broader, more open curves than were required for horse-drawn vehicles. These changes have been made in the interests of safety, due to the greater speed and inertia of motor cars.

Appearance is frequently a governing factor in determining the width of estate drives. Æsthetic satisfaction generally requires greater widths of roadway and smoother curves than the limitations of automobiles demand, hence we are fortunate in not often having to figure within very close limits in determining road design. In other cases the governing requirements will be unobtrusiveness, naturalness and grace of road line and surface, calling for the least possible road paving, the least grading and often frequent curves. Under these circumstances minimum width, sharp curves and heavy gradients are frequently involved in reaching a good solution.

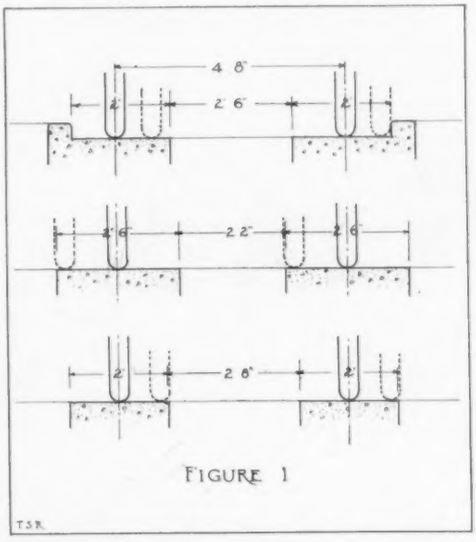


FIGURE 1

Minimum width of driveways is governed by the width of motor vehicles. Passenger vehicles vary in width from 5 ft. 4 in. to 6 ft. 4 in., with the average under 6 ft. Trucks vary from 6 ft. to 8 ft. in width. Automobiles "weave" more or less across a road surface and require greater surface than their actual width. Furthermore, if automobiles are confined to such a narrow surface that they cannot easily "weave," they quickly form ruts which soon destroy the pavement. These factors are involved in determining the width of road necessary for a single line of vehicles moving in one direction. Many opinions have been expressed, but it has now come to be more or less common practice to allow 9 ft. as the least practicable width for a one-way road surface.

If less width is essential, as in the case of approaches to suburban garages from the street to the rear of the lot where the property line is close to the house, it is advisable to lay a concrete pavement with rounded curbs to assist in keeping the car within the drive. In such cases it is possible to have the pavement only 7 ft. wide, but under no circumstances should the width be less than the extreme width of the vehicle. This minimum road width applies only to straight sections.

Two concrete runways are frequently used instead of solid pavements. Grass is planted between the runways to lessen the bareness of an otherwise ordinary pavement. Such runways should be laid 4 ft. 8 in. on centers for passenger vehicles when no curbing is used. If a curbing is desired a minimum overall distance of 6 ft. 6 in. to 7 ft. should be adhered to so that heavy coal, fuel oil or furniture trucks, some of which have a gauge as large as 6 ft. 1½ in., can pass along the pavement without injuring it. Since the gauge is measured to the center of the wheel, allowance should be made for the tread of the tires. Fig. 1 shows some suggested sections.

On curves a single roadway should be somewhat wider than the minimum dimensions just given. The "track" of automobiles increases beyond the normal gauge in proportion to the degree of curvature. When describing a circle of least radius the tracks of the inner rear wheel and the outer front wheel are sometimes as far apart as 9 or 10 ft., and the front fender extends beyond the outside line another foot or more. Increase in pavement width is generally necessary when runways or very narrow pavements are used in restricted areas. Driveways, except within turnarounds, seldom are so sharply curved as to require extra width.

With skilful driving and on straight sections,

automobiles can pass each other on a 14-ft. pavement. For estate roadways this is probably the smallest desirable width, and this figure should be used with caution. Narrow roadways should have wide, smooth grass berms free from obstructions, such as posts, trees or walls, so that in case of emergency cars may leave the pavement without danger of injury.

A more comfortable width of road and one more pleasant to drive over is 16 ft., while 18 ft. is very liberal, and dimensions greater than this need be selected only for æsthetic reasons. The need for three lines of traffic is seldom met in estate work.

Curves in driveways should be parabolic rather than circular. The gradual increase in the sharpness of the curve corresponds with the gradual turning of the steering wheel. Circular curves, especially on narrow roads, are hard to negotiate smoothly. Curves should also be governed by the grade. Sharp curves should never occur on steep grades.

On the outside of curves along embankments the edge of the road should be clearly defined. When the road surface is dark, and is bordered by grass without a curb, it is very difficult to see the road ahead at night, even with good lights, for frequently the trees and shrubs absorb so much light that they do not appear to be there. Birches, beeches, aspens or other trees or shrubs having very light bark or leaf color may be planted at such places to define the curve. Otherwise a white painted fence or a low wall having a light colored coping should follow the road completely around dangerous curves.

Roads may also be defined at night by illumination. Lighting suitable for estates is of three kinds: (1) that used merely to indicate the road surface; (2) that used to define objects on the roadway and (3) that used to clearly illuminate the roadway.

Many autoists prefer to drive over a dark road, depending on their headlights, rather than to have a line of bright lights along the side of the road. Within estates it is possible to overcome this difficulty by having the lights on very low pedestals, standing from a foot to 3 ft. above the ground, with the lamps concealed within reflectors, which cast the light directly out upon the road surface. This method clearly defines the road without producing any glare in the driver's eyes.

Another method of road lighting uses a few high, bright, but diffused sources, so spaced as to either illuminate an object beyond them or to throw an object between them and the approaching driver into distinct relief. For this purpose high candle power units in diffusing reflectors or globes are spaced a considerable distance apart at such locations that they may be seen quite a distance ahead. They are best suspended over the road and high enough to be out of the driver's eyes when he approaches close to them. Even the location of the light close to heavy foliage does not seem to diminish its effect. When carefully planned this system is the most economical, the safest and the most comfortable to drive by of any method yet devised. All objects are either (*a*) in relief against a bright background, (*b*) clearly illuminated by a nearby intervening light or (*c*) again in relief against the next source. A non-glaring light source of good strength is the principal requisite.

The third system of roadway illumination is similar to the so-called "White Way" method, consisting of a single row or parallel rows of elevated lights bordering the roadway sufficiently close together to clearly illuminate the whole pavement. This method is useful on private estates for formal approaches of some pretense, but has little merit other than its formality and brilliancy to warrant its great cost.

Condemnation cannot be too strong of the common use of exposed electric bulbs along the side of the roadway. This form of light has the maximum glare and the minimum of illumination and is more distressing than it is helpful. Such lights should invariably be fitted with diffusers or glare-reducers of good design.

Entrance courts and gateways are often desirable at the junction of a private driveway and a public road. When such an approach is sufficiently formal to require a gateway, care should be taken to set the posts well back from the street so that they will not constrict the curves at the sides of the junction. If the posts must be close to the street they should be set well apart.

The radius of the circle described by the inner rear wheel of an automobile which is turning in its least radius varies from 7 ft. to 17 ft. 8 in. The radius of the curbs at junctions of roads of minimum width should therefore be 18 ft. or more. This will enable a car to turn the corner very close to the curb, thus avoiding danger of collision with other passing vehicles.

It has been demonstrated, however, that an automobile making a 90-degree turn of this nature seldom reaches its minimum turning radius during the movement if traveling ahead uniformly. In practice this is not often a factor, as drivers do not actually follow the curb line, but approach a turn from nearer the center of the road. They nearly touch the curb at the center of the curve and then run out into the other road some distance. At junctions of narrow roads, or of a narrow drive with a highway, this practice becomes a menace, and demands relief by the provision of as liberal a radius as circumstances permit.

Some Economies in School Construction in Montreal

PART II. (Concluding Paper)

NOBBS & HYDE, ARCHITECTS

THE successful planning and construction of any kind of a building involves many close economies and a very careful use of space, which are the result of present costs and conditions. The building of schools means the use of public funds and this makes it more than ever necessary to secure the maximum of results at the minimum of cost.

The means by which several very practical school buildings have been worked out and their cost kept within the necessary limits involves several very interesting features.

IV. Corridor Finish

THROUGHOUT the series of schools under review the following corridor finish has been used. There is a cement dado to a height of 6 feet, with a base in red tile. The floors have 3-foot borders of terrazzo, the central area, 6 feet in width, being depressed ¼ inch and finished in cement over which is laid battleship linoleum. A galvanized iron fillet, set on edge at the inside of the border, protects the arris of the terrazzo from damage.

V. Class-Room Trim

THERE is a minimum of trim in the class rooms. At the window jambs the plaster is taken right in to the frames and the joint between is covered with a small cavetto. The sill aprons are continued by way of a chair rail. Below this there is a cement dado. A quarter round convex base takes the place of a skirting. The chalk rail to the blackboards is in wood, but the frame is formed of ¼- by 3-inch steel. The doors are of "slab" type, set in steel frames flush with the plaster and consequently there is no wood trim. In a number of schools, a standard rolled steel door frame was employed and this suited admirably, but in 1914, when the war made the utmost economy essential and the practice of the principle of "made in Canada" a duty, a door frame was made up by using 6-inch rolled steel channels with a stop bead of wood. This special frame was made at about half the cost of the imported article. For the internal wood finish red oak is used throughout.

VI. Lavatory Stalls

IN these schools the evolution of the lavatory stalls has been interesting. The stalls in the boys' lavatories called for most thought, as the school authorities insisted upon a construction such that the only possible means of access should be through the door. This requirement arose through a tendency among certain small individuals to bolt the doors in each of a row of stalls from the inside, a feat made possible by traveling along the tops of the partitions. These operations, of course, left a bad job for the janitor. The ordinary public lavatory stall with 6-foot 6-inch partitions and 12-inch floor openings and slatted doors would not do. After a number of experiments, which met with varied success, the following installation was devised and seems boy proof. (See Fig. 4.) The main frame is of 2-inch iron pipe. Stall divisions are ⅞-inch white marble to within 6 inches of the floor and 6 feet high. The marble

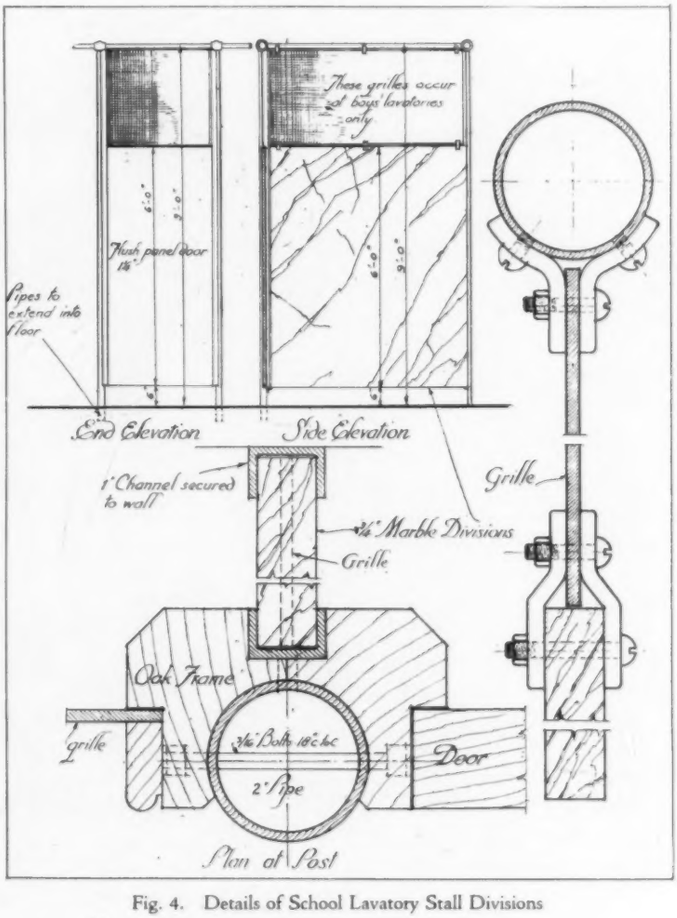


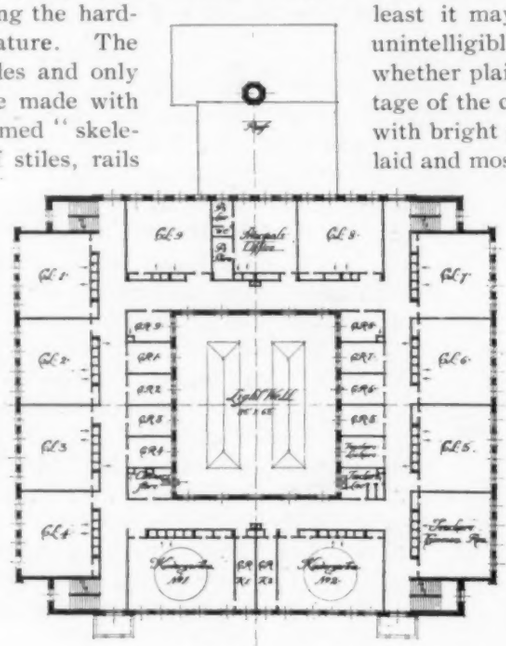
Fig. 4. Details of School Lavatory Stall Divisions

is carried in channel irons riveted to the pipe frame and bolted to the wall. The doors are hung in oak stops bolted to the pipe uprights. These stops are convenient for fixing the hardware; a very desirable feature. The doors are flush on both sides and only 1¼ inches thick. They are made with a core, which might be termed "skeleton," as it consists only of stiles, rails and cross braces. Above the doors and above the marble at the ends of ranges of stalls, white enameled cast-iron grilles extend to a height of 10 feet above the floor. Besides proving an efficient barrier this arrangement looks well and wears well.

VII. External Treatment

THE exteriors of these schools are, of necessity, treated in the simplest possible way. Care is taken to maintain the proportions of the prevailing types of windows as far as possible and to group the windows systematically so that if a certain dulness is inevitable at least it may not be a disagreeable or unintelligible dulness. The brickwork, whether plain or devised to take advantage of the contrasts of textured surfaces with bright pressed margins, is carefully laid and most carefully pointed with a flat keyed joint ¼ inch deep. The result aimed at is building without architecture, in the sense that conventional forms and arbitrary composition are entirely lacking. What symmetry and regularity is attained is merely the automatic expression of an orderly and economic plan, and a highly organic structural method.

Ornament and decoration are not entirely dispensed with, however. Occasional and sparing



First Floor Plan of Peace Centenary School

Peace Centenary School, Protestant Board of School Commissioners, Montreal, Canada
Nobbs & Hyde, Architects

use has been made of terra cotta mosaic panels and of cement reproductions of such things as Della Robbia's "Singing Choirs," Verocchio's "Boy with the Dolphin," etc., and occasional dedication panels in stone, and finials on the skyline.

VIII. Costs

AS observed above, the efforts of the architects have been directed to the discovery of economic materials and methods of construction, the use of which would neutralize the steady increase in building costs and maintenance charges. The fruits of their efforts are set forth in the table below giving detailed costs on four schools, three of which are very similar in type.

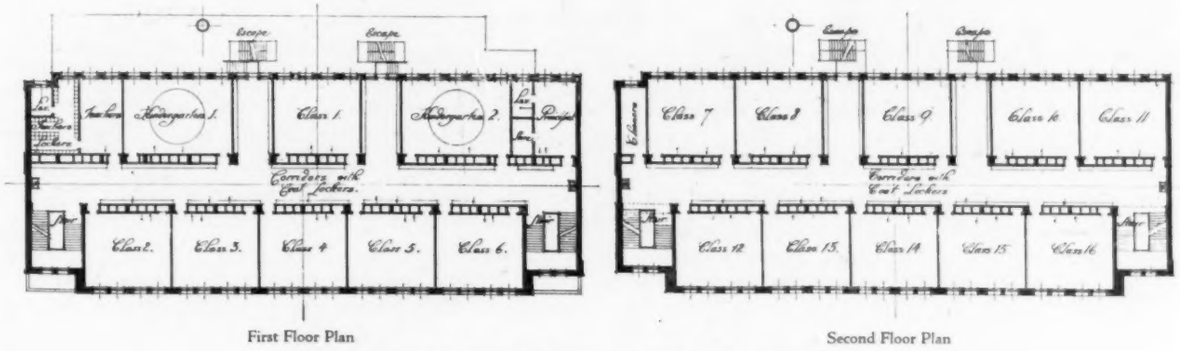
In these compilations the height of the buildings have in all cases been taken at 64 feet —the dimension from a level two feet below the ground floor to the top of the roof coping. It will be noticed that the Strathearn school cubic foot cost is above the average, but the cost per pupil is regular. This is evidence of the close packed character of the plan. The Edward VII school was a two-story building.

These low cubic foot costs, which resemble values in factory or loft building construction, have not been obtained by the sacrifice of sound workmanship or good materials. The structures are as substantial and lasting as it is possible to make them and the engineering specifications provide for an equipment compatible only with highest standards of requirements and the most efficient results.

Exterior View of Strathearn School, Montreal, Canada

COMPARATIVE TABLE OF COSTS

	Edward VII	Strath-earn	Peace Centenary	Bancroft
Common classes	22	26	31	29
Kindergarten	2	2	2	2
Sloyd	0	0	1	1
Cookery	0	0	1	1
Total class rooms	24	28	35	33
Boys' play room area, ft.	3,300	2,700	6,500	5,000
Girls' play room area, ft.	1,900	2,400	4,000	5,000
Gymnasium area, feet	2,000	2,100	3,600	2,200
Boys' urinals	18	41	58	34
Boys' water closets	16	17	36	26
Girls' water closets	16	31	58	35
Cubic contents, feet	931,000	873,000	1,434,000	1,250,000
Cost, general contract	$143,775	$168,000	$205,000	$181,000
Cost, engineering	$30,550	$33,500	$45,000	$41,000
Total cost	$174,325	$201,500	$250,000	$222,000
Cost per cubic foot	19c.	23c.	17.5c.	17.8c.
Cost per class room	$7,280	$7,150	$7,143	$6,700
Number of children	1,000	1,200	1,500	1,400
Cost per child	$174	$167	$167	$157
Date of completion	Sept.,'12	Sept.,'13	Sept.,'14	Sept.,'15



First Floor Plan

Second Floor Plan

Strathearn School, Montreal, Canada, Nobbs & Hyde, Architects

EDITORIAL COMMENT

THE INSTITUTE AND STATE SOCIETIES

AT the last convention of the Institute a subject to which a great deal of time was devoted and which drew out a general interest on the part of the delegates was the relation of state societies of architects to the Institute. It will be recalled that at the convention of the preceding year at Nashville a resolution was passed directing the Institute Board to encourage the organization of state societies. That this action was taken without a full understanding of its meaning may be inferred from the fact that since that convention at least five Chapters have recorded themselves as opposed to the organization of state societies.

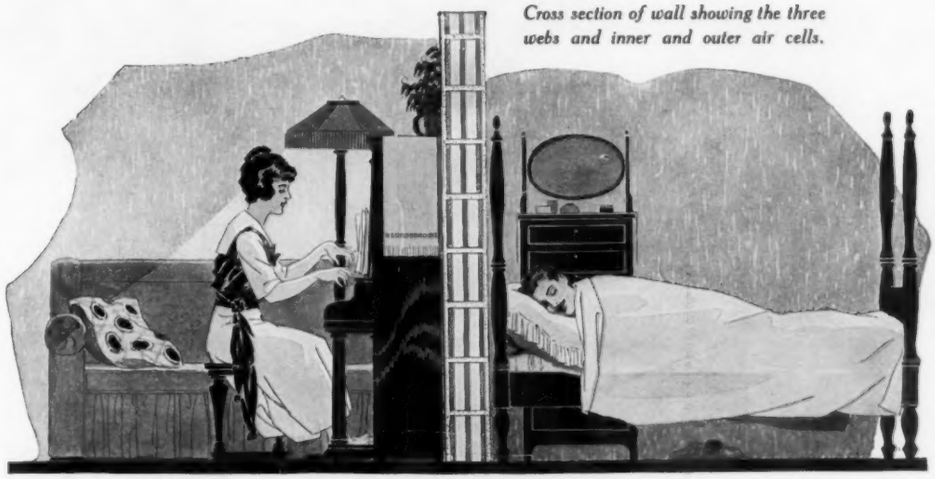
The question is one, therefore, on which there is not a unanimity of opinion. There is unquestionably in the minds of both those opposed to and those in favor of state societies a common purpose — a sincere desire to see a larger membership in the Institute and the greater prestige and influence which would be derived from the resulting larger representation of the profession. Since both policies are assumed to lead to the same result, the question resolves itself into a choice of method.

It is generally recognized that a characteristic of our present social structure is a disregard for the established order of things. We have by no means recovered from the upsetting effects of war, and in our attempt to make the world over on a new pattern the favorite recipe seems to be the abandonment of past policies and the search for new ones without much thought as to their comparative merits — the mere quality of newness being a sufficient endorsement. There is, perhaps, some of this character unconsciously inherent in the present feeling for greater democracy in the Institute. With a condition to meet, the first impulse is to set up new machinery; but it would seem that before effort and money are expended in developing the new machinery a careful analysis should be made of existing facilities to determine in what degree they have failed, for is it not likely that the new attempt might have the same fundamental faults as the old, if such exist in the present organization?

The fundamental question is the means of securing greater representation of architects in a national body. It is proposed that state societies be established, in which all registered architects in states where registration laws are in force and all honorable practitioners in other states be admitted to membership in a local organization, which shall govern itself independently of any other association and in accord with local conditions. These state associations would have representation at the annual conventions of the Institute and would be presumed to act as training grounds for future Institute members. Their dues would be placed at a moderate figure so that no architect would refrain from joining because of the expense attached. The result, it is hoped, would be a series of strong local organizations that would advance the interests of the profession in the respective localities in accord with particular conditions that exist in them.

Since the existing state societies and the Institute have for all practical purposes the same objects, as pointed out by the various state society delegates who spoke at the last convention, would not the creation of a large number of new state societies be a duplication of work the Institute Chapters are now doing or could do if their number were sufficiently enlarged? With the desire for democracy supplied by the state societies, would not the Institute need to become, as some claim it it is now, an aristocratic body, accessible only to the few? Could there be any common ground of understanding between the Institute and these local organizations? Would not the inevitable sequel be the formation of a Federation of State Societies, setting up a spirited competition between itself and the Institute for members, but in other respects working along different channels?

Sufficient happenings have already occurred to indicate that instead of strengthening the Institute, which is the aim all seem agreed upon, the establishment of state societies has weakened the national body. The formation of the Indiana State Society was followed by the abandonment of the Indiana Chapter, and in New York the newly formed state society has resulted in giving up the New York State Association of Chapters. In an interesting compilation of data in the *Institute Journal* for May on the relation of state societies to the Institute Chapters prepared by Charles St. John Chubb, there appears to be Institute weakness in all states in which there are state societies with the exception of Illinois and Washington. This would indicate either that the state societies had been more aggressive in securing members or that they were more acceptable to architects as a form of organization. It is difficult in view of these statistics to see how a larger number of state societies would strengthen the Institute and increase its membership. The method of studying the present organization with a view to adapting the local chapters to meet present conditions would seem more feasible. Surely the same effort required to organize new state societies if applied to increasing chapter membership would strengthen the Institute directly and not subject it to the possible competition of another national body.



Cross section of wall showing the three webs and inner and outer air cells.

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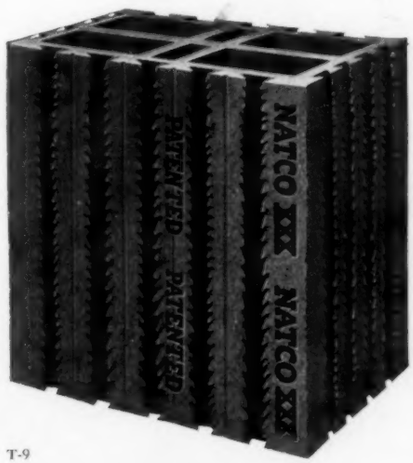

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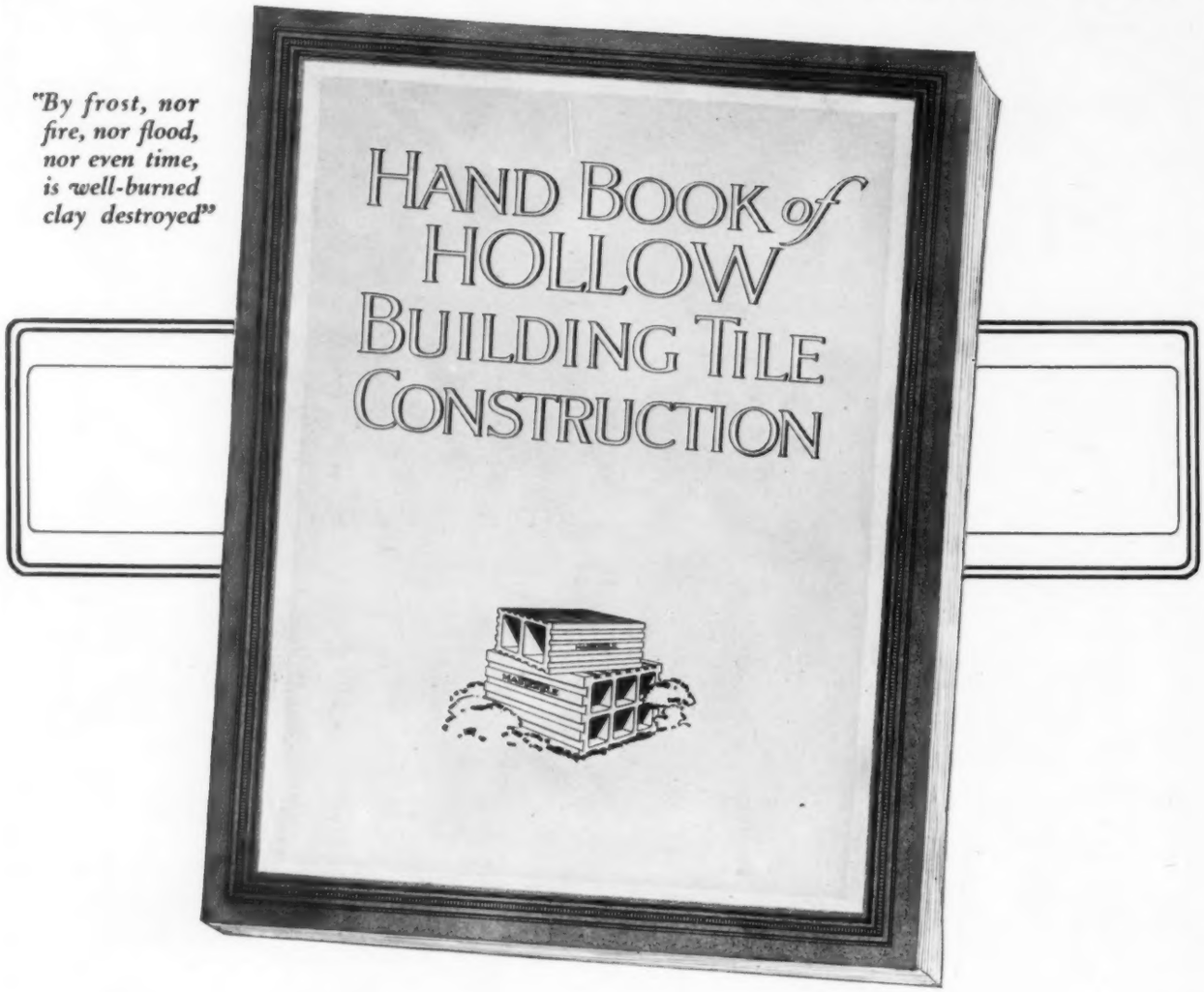

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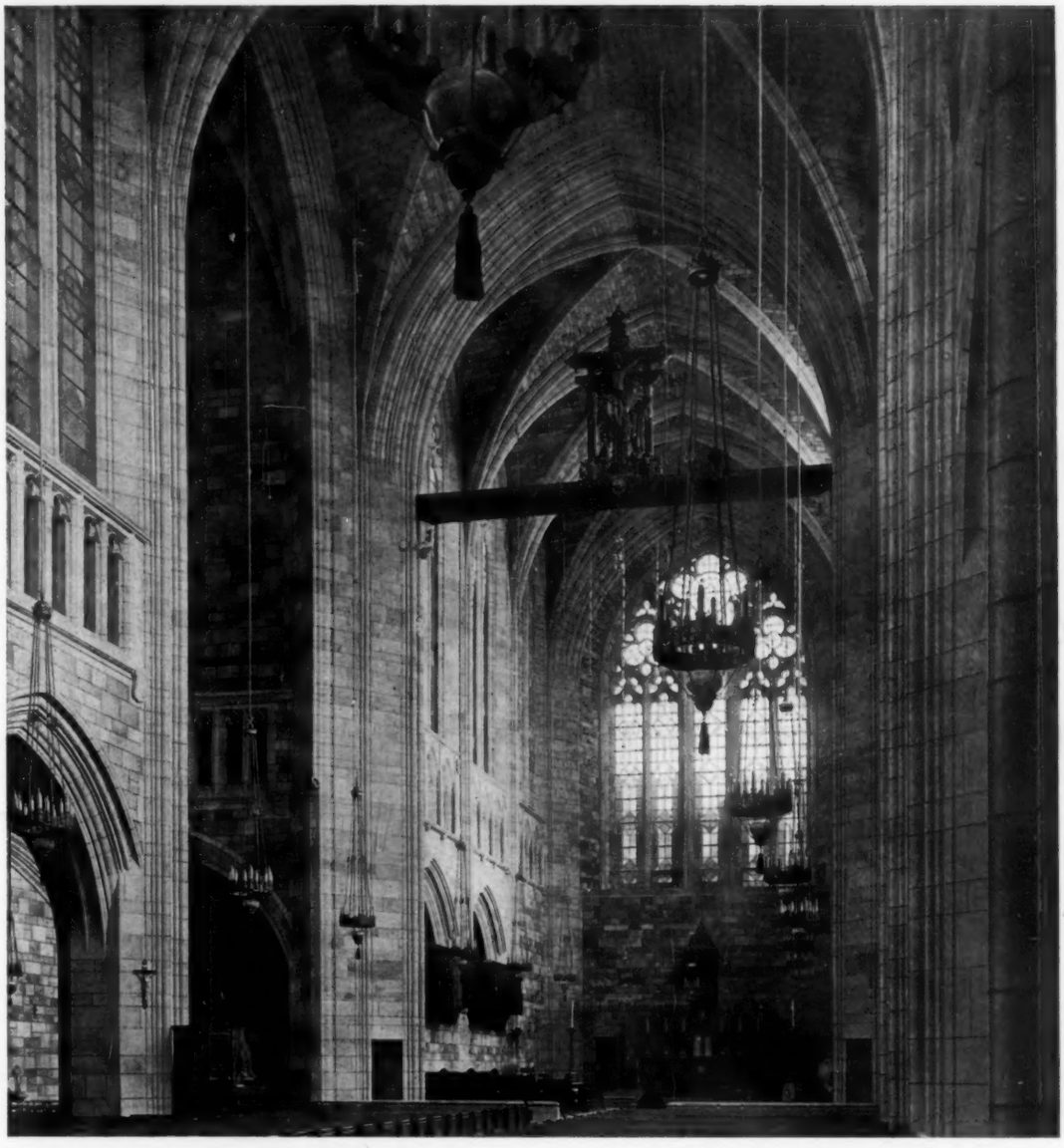

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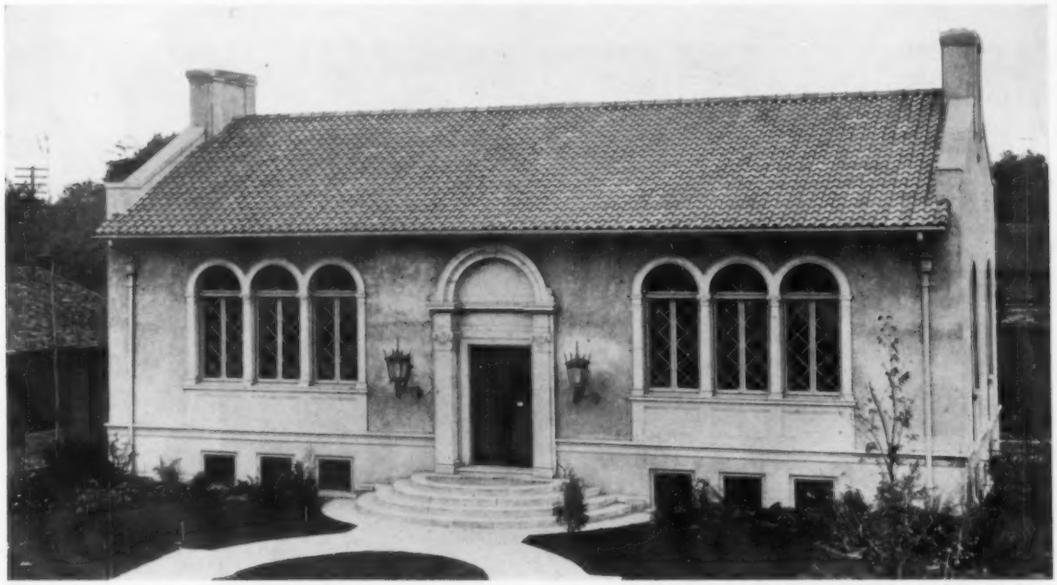

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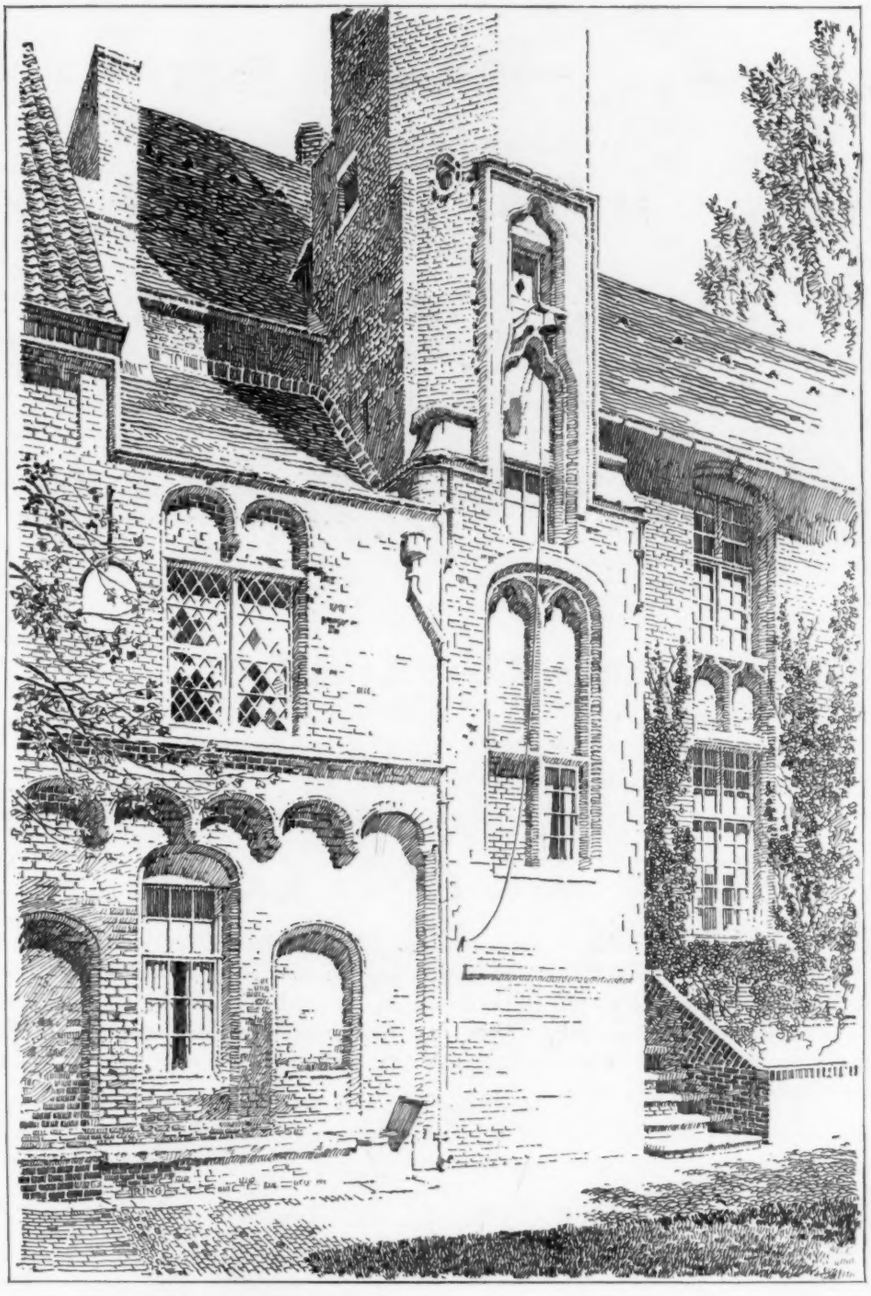

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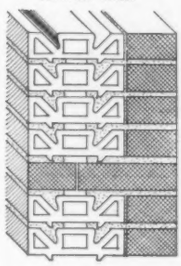

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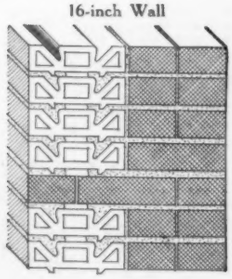

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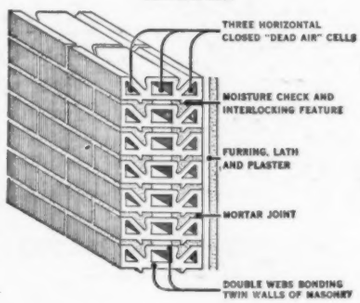
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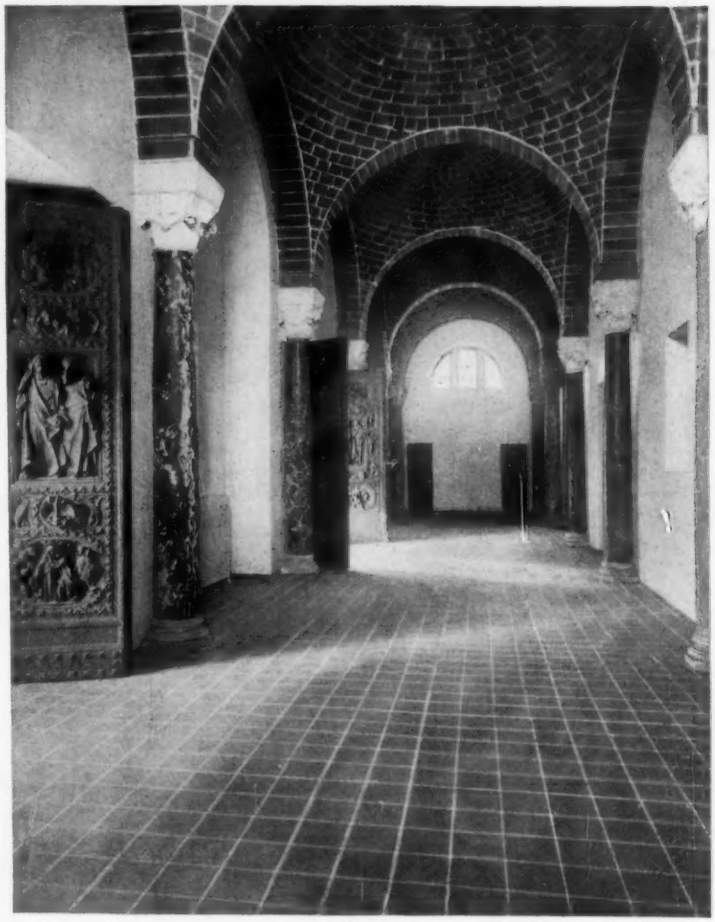

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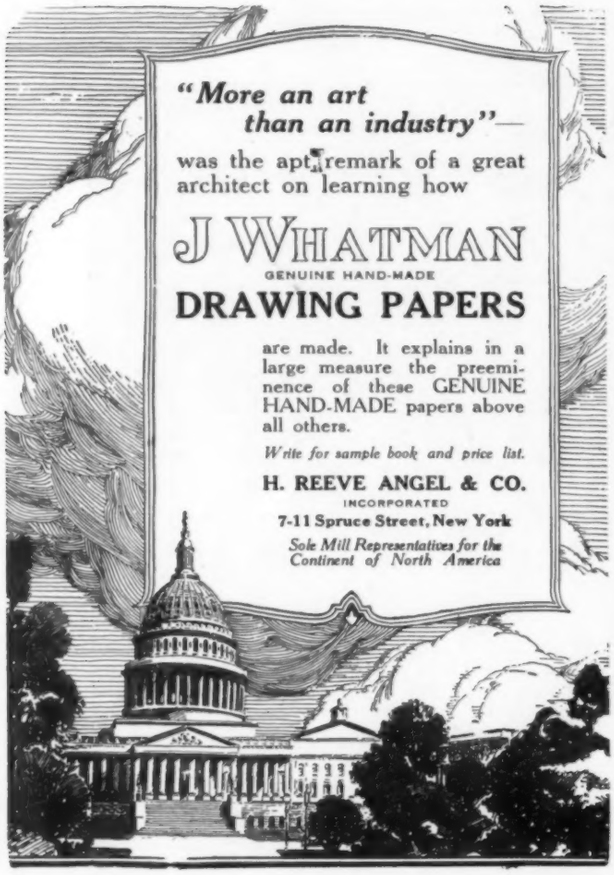
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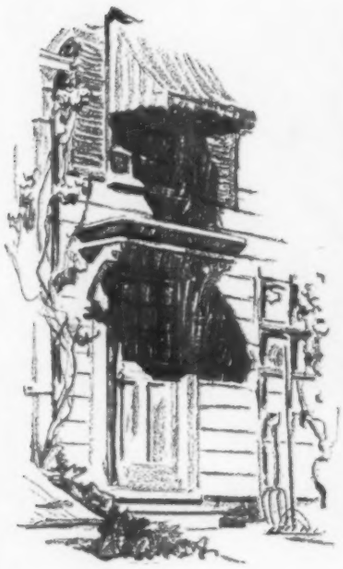

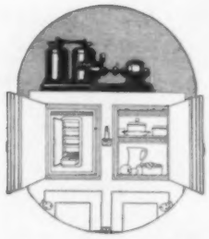

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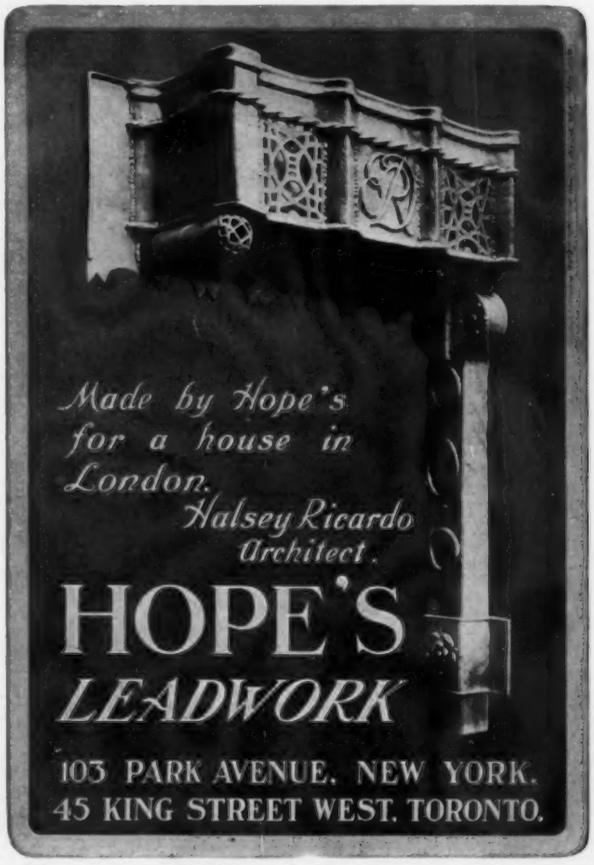

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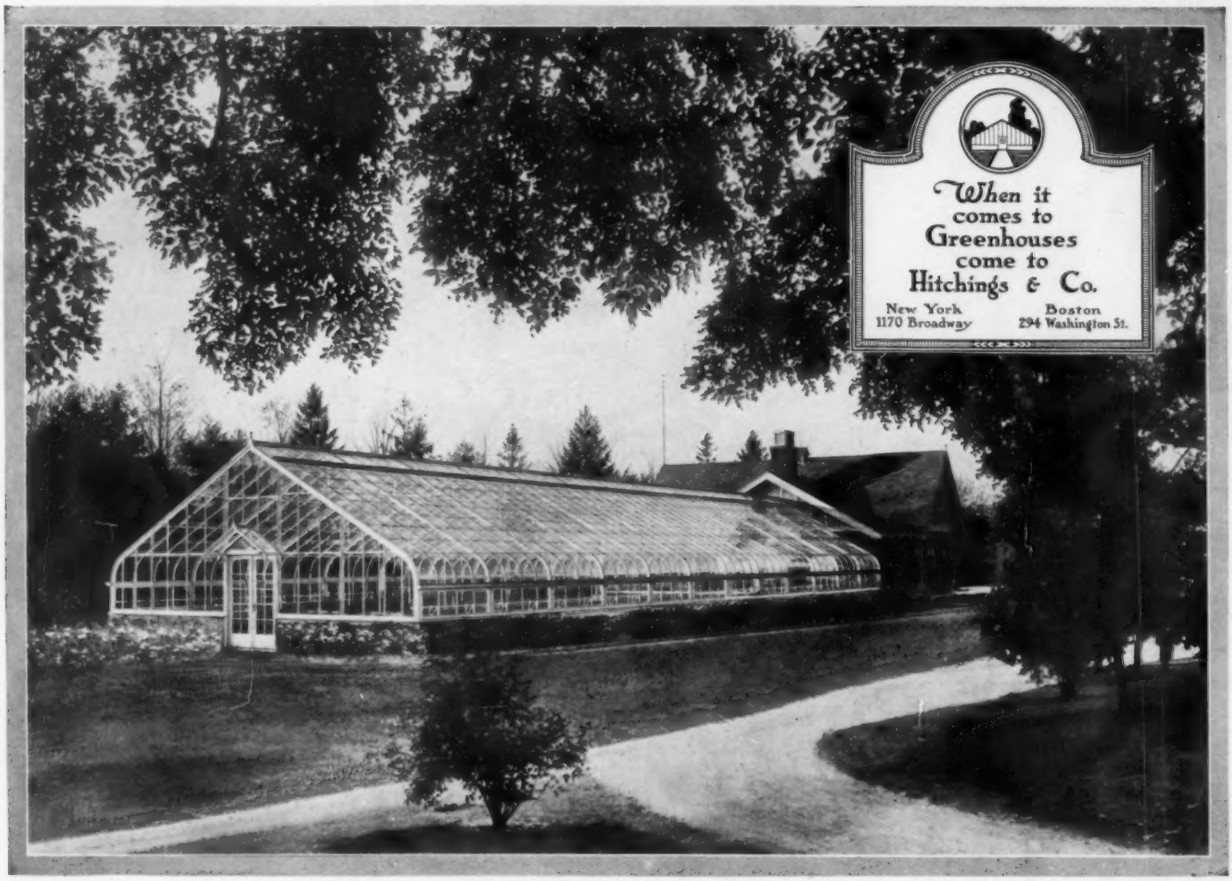

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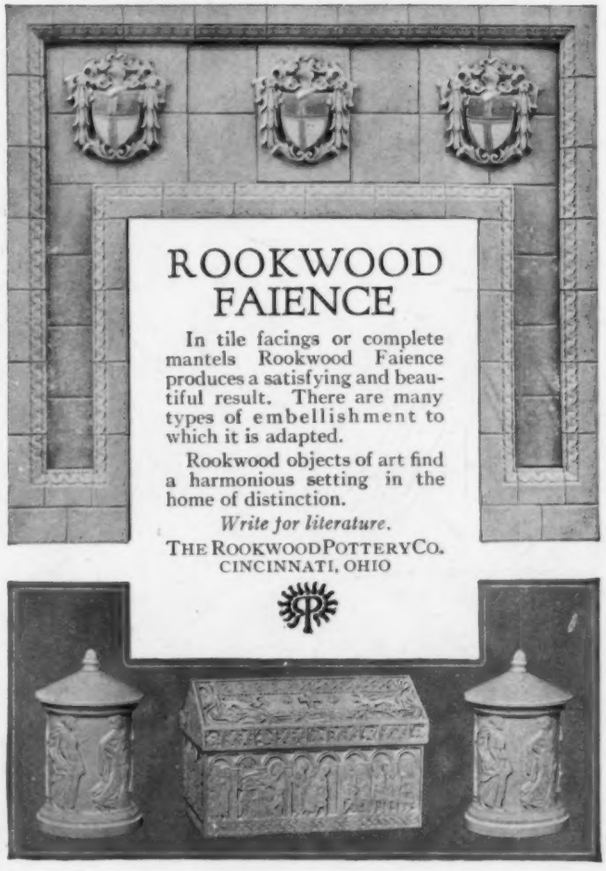
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NAME OF GRANITE	PRODUCER AND MANUFACTURER	LOCATION OF QUARRY	GRAIN	COLOR	TECHNICAL CLASSIFICATION
Bethel White	Woodbury Granite Co., Hardwick, Vt.	Bethel, Vt.	Coarse inclined to Medium.	White—faintly mottled with Gray.	Quartz-Monzonite.
Mount Airy	North Carolina Granite Corp., Mt. Airy, N. C.	Mount Airy, N. C.	Medium	Very Light Gray	Biotite.
Do	Lemmerman & Hoffman Gr. Co., Mt. Airy, N. C.	do	do	do	Do.
Do	Mt. Airy Granite Cutting Co., Mt. Airy, N. C.	do	do	do	Do.
Do	J. D. Sargent Granite Co., Mt. Airy, N. C.	do	do	do	Do.
North Jay	Maine & New Hampshire Gr. Corp., North Jay, Me.	North Jay, Me.	Fine	Very Light Gray	Biotite-Muscovite.
Chelmsford	H. E. Fletcher Co., West Chelmsford, Mass.	West Chelmsford, Mass.	Medium	Light Gray	Muscovite-Biotite.
Victoria White	Milford Pink-Victoria White Gr. Co., Milford, Mass.	Fitzwilliam, N. H.	Fine	do	Biotite-Muscovite.
Milford, N. H.	Lovejoy Granite Co., Milford, N. H.	Milford, N. H.	Fine inclined to Medium.	do.	Quartz-Monzonite.
Concord	John Swenson Granite Co., Concord, N. H.	Concord, N. H.	Fine to Medium	Light to Medium Gray	Muscovite-Biotite.
Do	New England Granite Works, Westerly, R. I.	do	do	do	Do.
Westerly Blue-White	do	Westerly, R. I.	Fine	Bluish Gray	Quartz-Monzonite.
Woodbury Gray	Woodbury Granite Co., Hardwick, Vt.	Woodbury, Vt.	Medium	Medium Gray	Biotite.
Rockport Gray	Rockport Granite Co., Rockport, Mass.	Rockport, Mass.	Medium to Coarse	Medium Gray, slight bluish-green tinge.	Hornblende.
Stonington Pink-Gray	Rodgers Granite Corp., 271 W. 125th St., New York City.	Deer Isle, Stonington, Me.	Coarse	Pinkish-Lavender tinted, Medium Gray	Biotite.
Goss Pink	John L. Goss Corp., Stonington, Me.	Crotch Island, Stonington, Me.	do	do	Do.
Conway Pink	Maine & New Hampshire Gr. Corp., North Jay, Me.	Redstone, N. H.	do	Light Pink Mottled with large gray and small black spots.	Do.
Milford Pink	Milford Pink-Victoria White Gr. Co., Milford, Mass.	Milford, Mass.	Medium to Coarse	Light to Medium Pink, black mica spottings.	Do.
Jonesboro	Booth Bros. & Hurricane Isle Gr. Co., 208 Broadway, New York City.	Jonesboro, Me.	Coarse inclined to Medium.	Pinkish-Gray	Do.
Stony Creek	Milford Pink-Victoria White Gr. Co., Milford, Mass.	Stony Creek, Conn.	Very variable Medium to Coarse gneissoid texture.	Medium Reddish-Gray.	Do.
Red Westerly	New England Granite Works, Westerly, R. I.	Westerly, R. I.	Medium inclined to Coarse.	Reddish-Gray Speckled with Black.	Do.
Moose-a-bec Red	Rockport Granite Co., Rockport, Mass.	Jonesport, Me.	Coarse	Dark Reddish-Gray with white and pinkish Feldspar.	Do.
Rockport Sea-Green	do	Rockport, Mass.	Medium to Coarse	Dark Olive-Green-Gray with Black Spottings.	Hornblende.
Conway-Green	Maine & N. H. Granite Co., North Jay, Me.	Redstone, N. H.	Coarse	Dark Yellowish-Greenish - Gray with Black Spottings.	Biotite-Hornblende.
Somes Sound	Booth Bros. & H. I. Granite Co., 208 Broadway, New York City.	Mt. Desert, Me.	Coarse inclined to Medium.	Light Grayish-Buff.	Biotite.
Rockport Seam-Face	Rockport Granite Co., Rockport, Mass.	Rockport, Mass.	Medium	Dark Yellow-Brown, Bright Rust-Brown, Light Yellow-Brown.	Hornblende.

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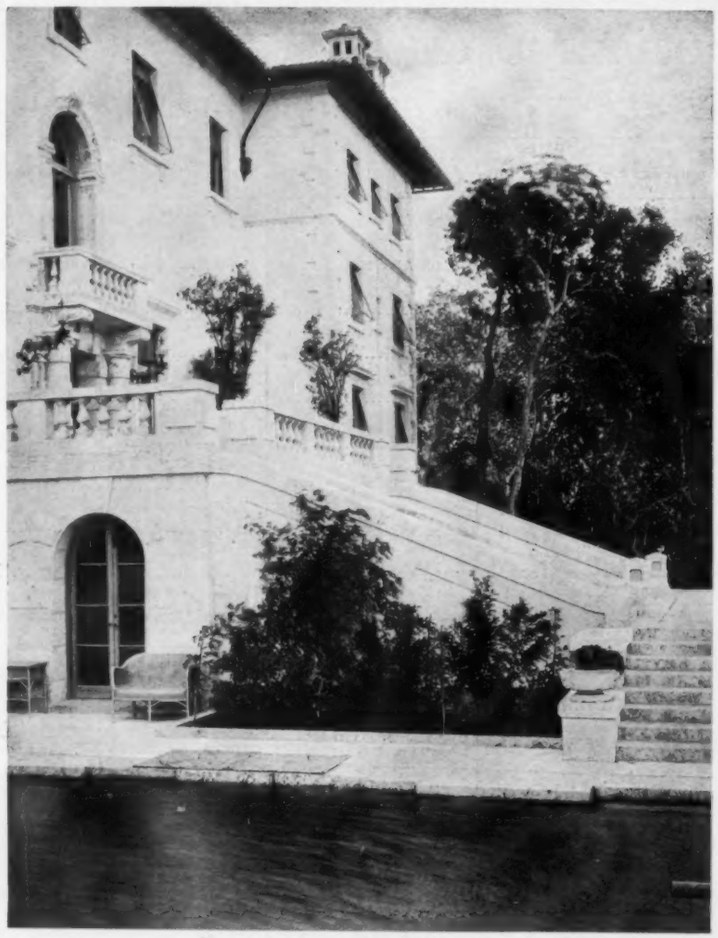
A Detail



Residence of
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NEW YORK CITY

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Medusa White reflects softly the intense sunlight and heat of the tropics. Or it glows with warm, appealing beauty under the cold, wintry light of a northern sun. And always it blends with the landscape setting, bringing out the full charm of versatile artistry.

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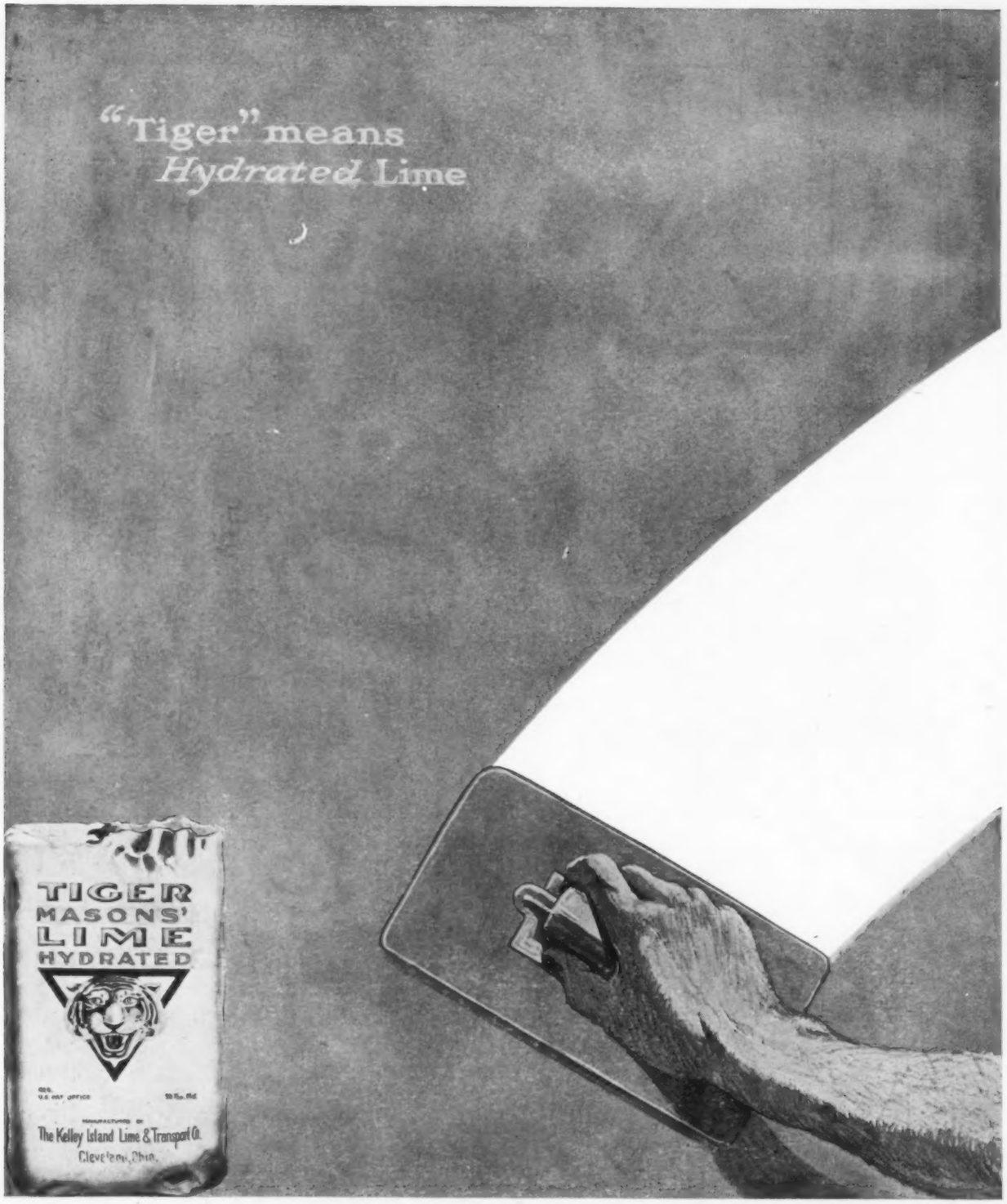

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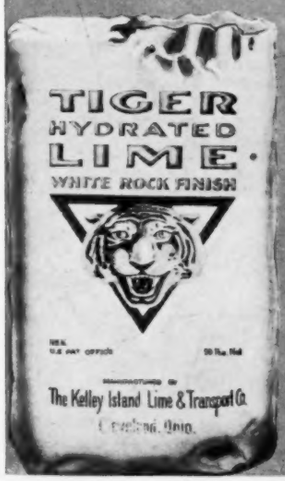

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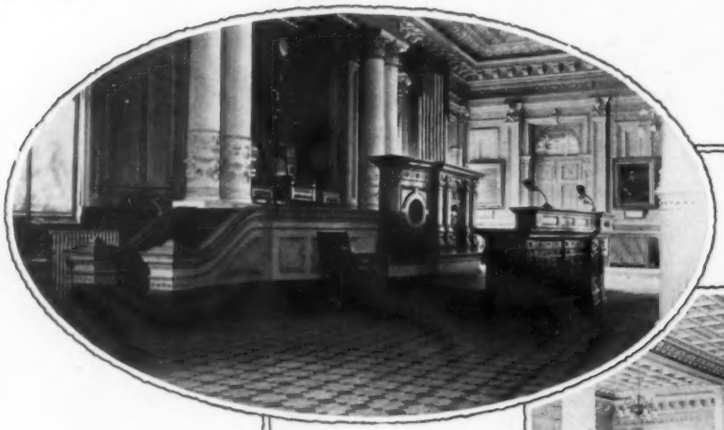

A fine example of the effective use of an appropriate linoleum floor. Five hundred square yards of Armstrong's Parquetry Inlaid Linoleum, No. 652, were used in this installation in the Oregon State House.

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THIS linoleum floor in the Oregon State House demonstrates admirably the distinct advantages of this modern material. In such an edifice an atmosphere of dignity is imperative, and yet the floor must have certain practical qualities. Armstrong's Parquetry Inlaid Linoleum fully meets these requirements. It is especially rich when waxed, adapted to fireproof construction, quiet, easily cleaned, inexpensive to maintain, and exceedingly durable when cemented down firmly over felt paper as a permanent floor.

No doubt there are occasions when you could employ an Armstrong's Linoleum Floor to advantage. Plates showing the newer designs and pleasing colorings are at your disposal without charge; also tables of comparative grades, gauges, weights, etc. A request will place you under no obligation.

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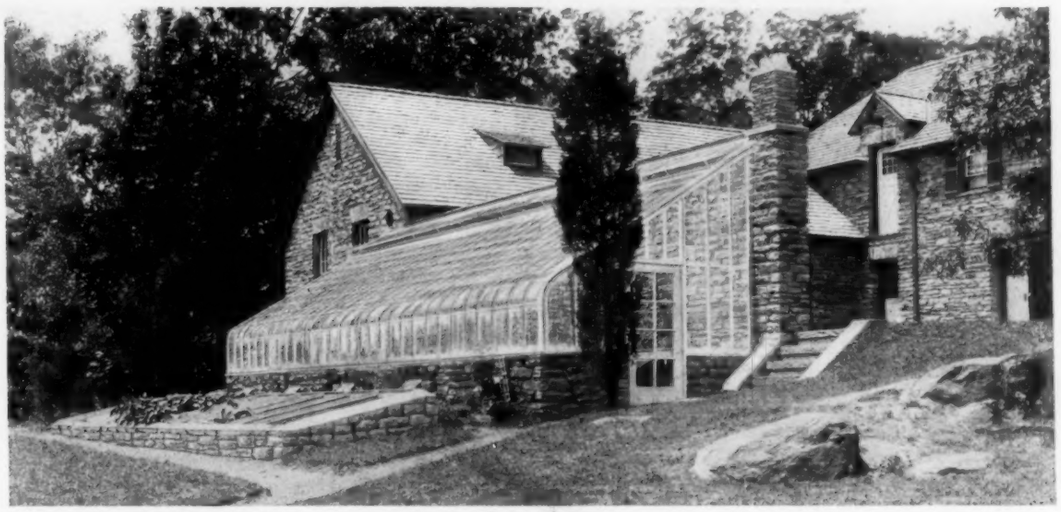

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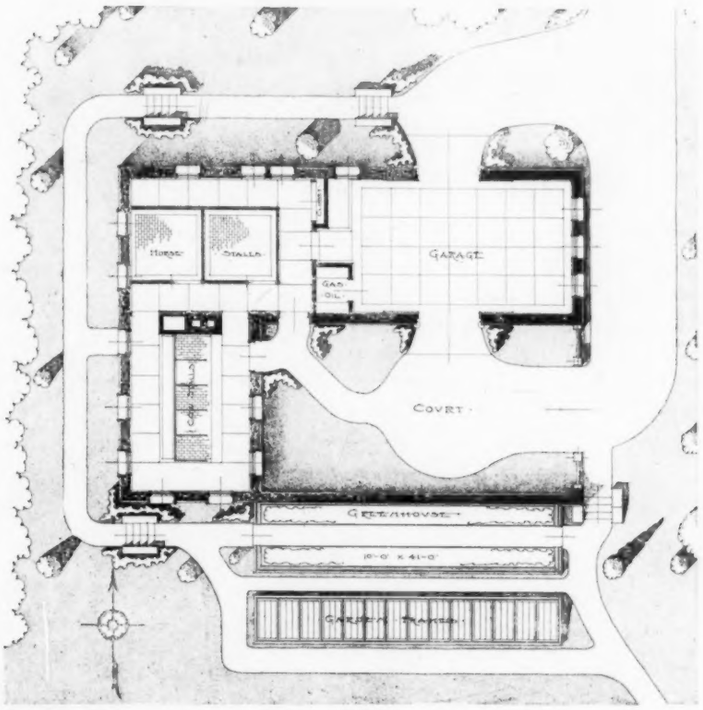

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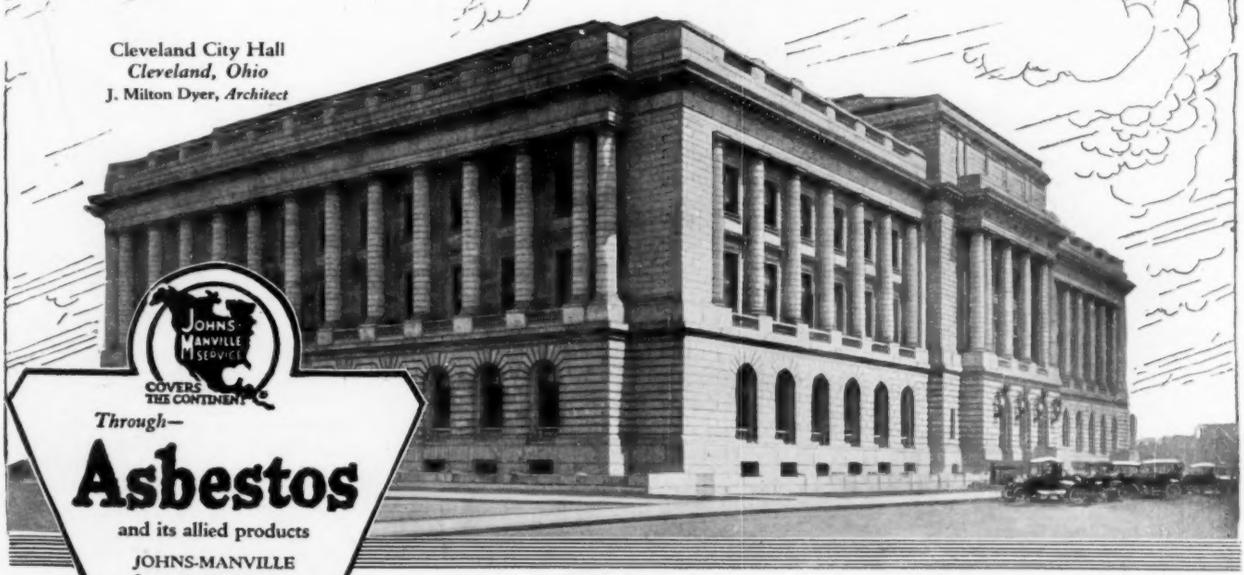

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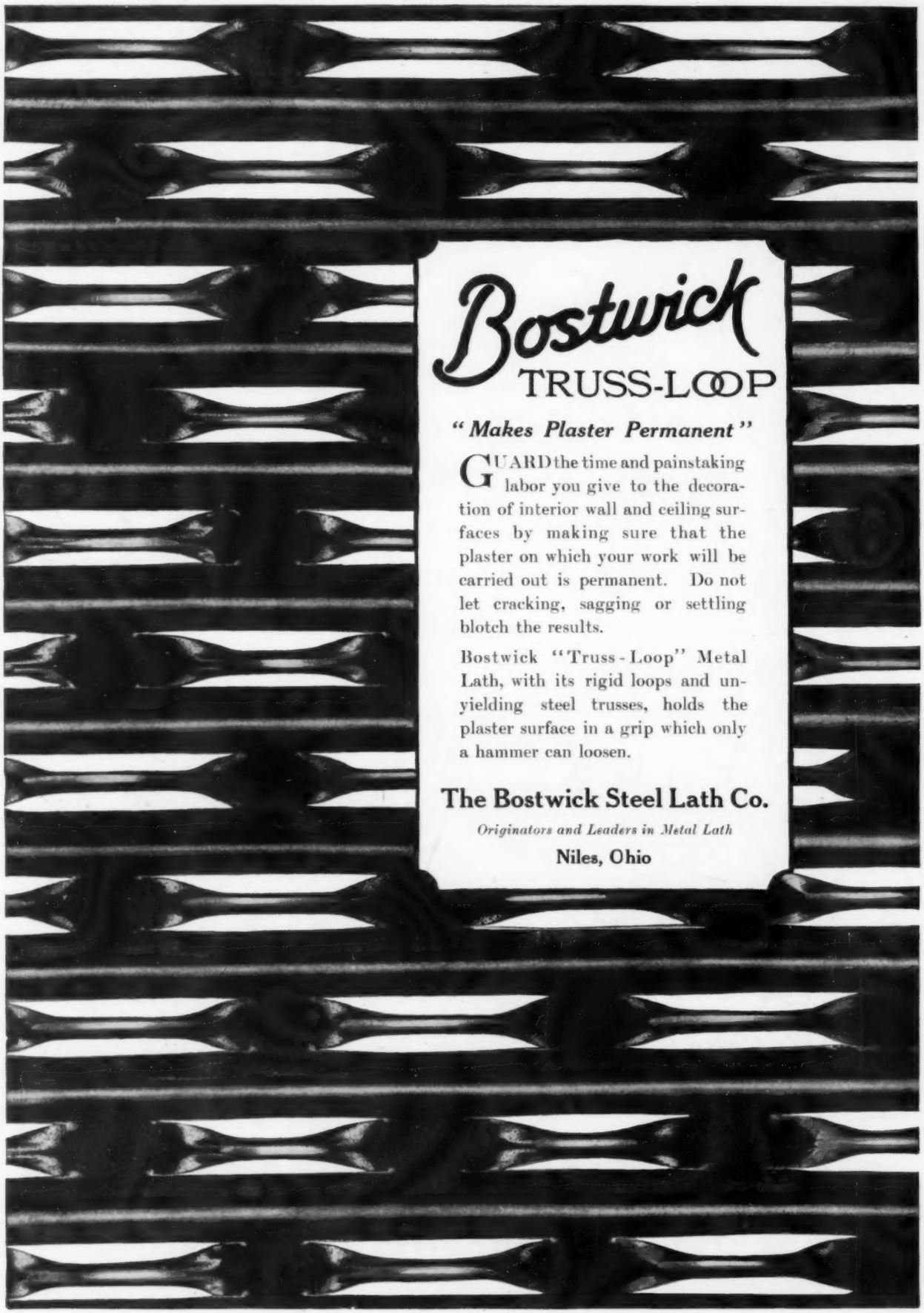

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THE ARCHITECTURAL FORUM

VOLUME XXXII NUMBER 6

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ALBERT J. MacDONALD, Editor

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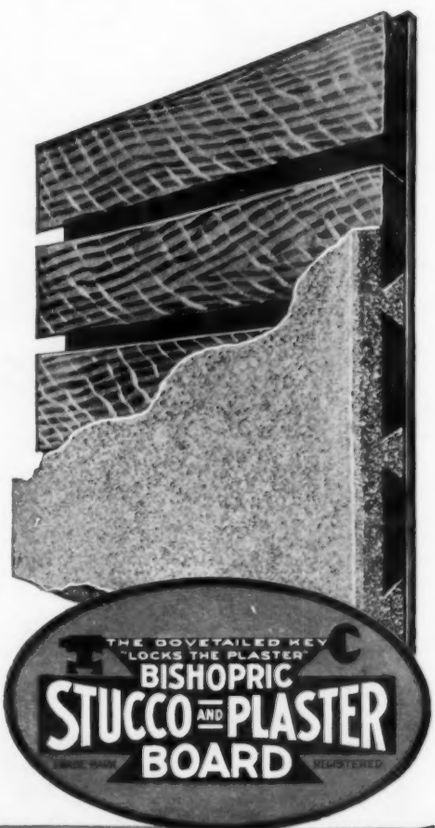
Bishopric Board Grips Stucco

and Locks it Securely for Generations –



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THE EDITORS FORUM

ARCHITECTS' OBLIGATIONS IN CRITICAL BUILDING SITUATION

THE difficulties encountered in all phases of the construction industry to-day and the consequent high cost of building make the study of our methods of building an obligation to be met by architects. In common with other American industries wasteful practices have been permitted in building, not intentionally or knowingly, of course, but with results quite the same, nevertheless. To-day the burden of cost is so great as to prevent the construction of any buildings except those of the greatest necessity or where abnormal returns can be had that are in proportion to the investment.

There is, furthermore, little reason to expect any great improvement in this situation. The shortage of buildings that now exists will steadily become more acute. This is of especial seriousness in the field of housing. Recent reports from New York City indicate that in spite of new construction there are to-day less living quarters in New York than at the beginning of the year. This is caused by the large number of alterations of old residential buildings into offices and shops. The limited building activity to-day is confined to structures affording the largest rate of return; speculative builders are investing their funds in existing buildings which can be altered and produce a handsome profit in view of the demand for space of all kinds. This effect is further seen in such important operations as the alteration of the Knickerbocker and Manhattan hotels in New York into office buildings. These hotels occupy extremely valuable sites, and with the present demand for office space a greater return can be had from such use of the buildings. These operations provide an interesting instance of the manner in which capital is attracted to the sources of greatest earnings and indicate the difficulty of securing financial assistance for housing with its low rate of return.

This trend of affairs, however, is not meeting the issue. It temporarily solves one difficulty but in doing so aggravates another. What we need is more new buildings. The present conditions must be met and a way found to produce the buildings. One logical and easily possible way is to evolve means of eliminating the waste in buildings. It should be possible to revise our ideas of planning so that buildings could be erected in which nearly 100 per cent of their area would be usable and income-producing space. If this result could be had it is not difficult to conceive a building erected to-day at a cost but slightly in excess of one of a few years ago that provided the same rentable area.

This point is clearly indicated in the paper on "Economy in School Planning," by W. R. McCornack, architect for the Board of Education of Cleveland. It is quite probable that the money spent in former years in the construction of waste space in our schools would be sufficient to pay the entire cost of the school buildings we need to-day. This condition applies not alone to schools; it is equally important in office buildings and apartment houses, in fact, in any type of building you choose to name.

The solution of the present difficulty must come through more careful attention to the principles of planning. Building plans should be made to conform easily to economical methods of construction; effort should be made to take advantage of standardization whenever possible, and non-productive space should be reduced to the absolute minimum. These conditions are limiting, yet to meet them, we need not hamper our architectural expression. True architecture is a product of its time and conditions and this is as true to-day as in the Renaissance period.

STIMULATING GOOD TASTE

AN exhibition of home furnishings made and sold in Rochester, N. Y., was displayed in in the School of Applied Art, Mechanics Institute, during the week of May 2d to 8th. The primary aim of the exhibit was to display moderately priced furnishings. The purpose was purely educational and has created an unusual amount of interest in the community.

The exhibit was constantly attended and developed many inquiries showing that the public is keenly alive to the need of making wise selections in decorating their homes.

Two living rooms, a dining room, a hall and a bedroom were completely fitted out and were supplemented in another part of the building by comparative groups of furnishings showing well chosen pieces and others less desirable, the first group in each case costing less than the second group.

It is planned to establish a free service bureau at the school where the public generally may make inquiry concerning decorating and furnishing of their homes. Instructors will advise with them and recommend material which may be purchased in the community. The exhibit proved to be not only successful, but received the cordial backing and co-operative support of both manufacturers and retailers throughout the city.

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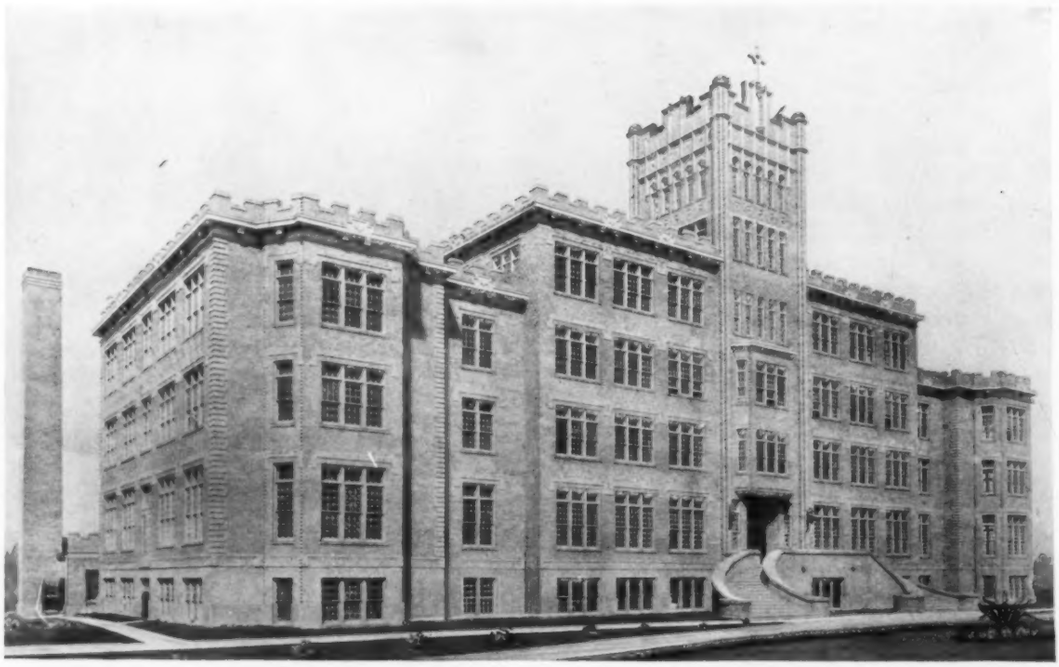

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Barrett Specification type of Roof on Warehouse Pier No. 2 of the Norfolk & Western Railroad at Lambert's Point, Va.

No maintenance expense for 23 years—

IN 1892 the Norfolk & Western Railroad erected at Lambert's Point, Va., the warehouse piers shown here. A Barrett Specification type of roof was used to cover these buildings.

This was in the days before The Barrett Company issued Surety Bonds on Barrett Specification Roofs, and before some of the present-day improved roofing methods had been worked out.

Notwithstanding this, *there was no maintenance expense of any kind on these roofs until 1915.* In other words, the owners were absolutely free from roof trouble and roof expense for 23 years.

When the time came to roof their new warehouse piers, there was no question in the minds of officials of the Norfolk & Western Railroad as to what roof they would use. They ordered the new buildings covered with Barrett Specification Roofs as a matter of course.

These roofs, shown in the illustrations below, cover an area of more than 400,000 square feet.

On them we have issued our 20-Year Surety Bond, and while the railroad officials were pleased to get the Surety Bond, they knew from experience that it was not necessary, for the roofs would outlive the guarantee.

The Surety Bond

The Surety Bond is offered on all Barrett Specification Roofs of fifty squares or more in all cities of 25,000 or over, *and in smaller places where our Inspection Service is available.* It is issued by the U. S. Fidelity & Guaranty Company of Baltimore, and exempts the owner from all maintenance expense for the life of the Bond.

Our only stipulations are that the Barrett Specification, *revised April 15, 1920,* shall be strictly followed and that the roofing contractor shall be approved by us and his work subject to our inspection.

These roofs take the base rate of insurance and cost less per year of service than any other type of "permanent" roof.

Important Notice

The Barrett Specification 20-Year Bonded Roof represents the most permanent roof-covering it is possible to construct, and while we bond it for twenty years only, we can point to many roofs of this type that have been in service over forty years and are still in good condition.

For those who wish a somewhat lighter and lower priced roof covering, we recommend the Barrett Specification Type "A" Roof, bonded for ten years.

Both roofs are built of the same high-grade waterproofing materials, the only difference being the quantity used.

Full details regarding these Bonded Roofs and copies of The Barrett Specification sent free on request.

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Elizabeth	Buffalo	Baltimore	

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Barrett Specification Roofs on Piers of the Norfolk & Western Railroad at Lambert's Point, Va. The total area of these roofs is more than 400,000 square feet.

Roofing Contractors: Odend' Hal Monks Corporation, Norfolk, Va. Gen'l Contractors: John P. Pettyjohn Co., Lynchburg, Va. Architects: Engineering Dept., Norfolk & Western R. R., Roanoke, Va.

Manufacturers' Catalogs and Business Announcements

ANNOUNCEMENTS

Mr. Edward B. Richardson, formerly of Richardson & Hale, and Mr. Harry Gay, for the past nine years with Stone & Webster, announce the formation of a partnership under the firm name of Richardson & Gay, consulting engineers, with offices at 220 Devonshire street, Boston, Mass.

Mr. Clarence H. Larsen and Mr. John Glenn Mason announce the formation of a partnership under the firm name of Larsen & Mason, architects-engineers, with offices in Suite 408-11, Terminal Building, Lincoln, Neb.

Messrs. Godley & Sedgwick announce the removal of their office from 244 Madison avenue to Room 732, 522 Fifth avenue, New York, N. Y.

Messrs. Norman Hatton, S. E. Holmes and C. B. Anthony announce that, owing to the withdrawal of William J. Klein, they have formed a new partnership under the name of Hatton, Holmes & Anthony, Masonic Temple, Cedar Rapids, Iowa.

Notice of removal of Messrs. Howell & Thomas previously made in this column should read, from 2032 Euclid avenue to 4400 Euclid avenue, Cleveland, Ohio.

Mr. Ralph H. Cameron, architect, announces the removal of his offices from 606 Frost Building to 1115-16 Central Trust Building, San Antonio, Texas.

Mr. Elwyn E. Seelye, C.E., announces the formation of a partnership to be known as Seelye & Fraser, with offices at 101 Park avenue, New York, N. Y. The new partners will be Edwin A. Fraser, A. L. Stevenson and C. E. Hamilton.

Mr. Lamont H. Button has opened an office at 331 Fourth avenue, Pittsburgh, Pa., for the general practice of architecture.

CATALOG REVIEWS

THE COMMON BRICK MANUFACTURERS' ASSOCIATION OF AMERICA, Cleveland, Ohio. "Brick for the Average Man's Home" (8½ x 11 ins.). 72 pp.

This book contains a selection of thirty-five houses of various types shown by perspective drawings and floor plans. Accompanying most of the sketches are pages devoted to description of the particular house, and features of special merit in each case are illustrated by neat pen and ink reproductions. Many of the pertinent facts in building with brick are enumerated so that a very clear impression of the material is left with the reader. Information and illustrations are arranged for the greatest ease in perusing the subject. Copies of the book may be had from the Association at $1.00 each.

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Architectural and Landscape Rendering

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WANTED, DRAFTSMEN, ARCHITECTURAL OR STRUCTURAL

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WANTED, SUPERINTENDENTS OF CONSTRUCTION

Capable of supervising the construction of hospital buildings. Must have had experience in purchase of building materials and employment of labor. State age, education and experience in detail. Give former employers and list of operations. No Civil Service examination required. Write Construction Eng'r., U.S. Public Health Service, 8th and E streets, N. W., Washington, D. C.

Classics in Clay

TREMONT TEMPLE, BOSTON, MASS.

BLACKALL & NEWTON, ARCHITECTS

By OSWALD SPEIR

CLASSICS in clay begin to emerge from our very recent American architectural history. Interest and profit might result could we but release ourselves for a moment from this twentieth-century pressure of doing the biggest thing, the most technically perfect thing, the most perfectly mechanical thing, and consider our steps through our own very rapid progress to the highest point in the development of the art of terra cotta.

Defining classics defy precedent and instead of tediously harking back to fourteenth-century Italy and Certosa et Pavia, think nineteenth-century New York, Boston, Philadelphia, Chicago, St. Augustine. Think Post, Hardenbergh, White, Hastings, Wilson, Furness, Stewardson, Richardson, Burnham and other leaders. We vision therefrom classics in clay, terra cotta used in simple appreciation of merit in the material, maintaining the degree of excellence that from century to century entitles it to such distinction.

These modern masters considered its limitations, and just as fully its wonderful possibilities, as a medium of æsthetic expression. They did not think stone or cast iron or wood or tin, but created in clay products terms, and taking advantage of subtle plasticity, vibrating and sensitive modeling, beauty of color tones, and texture and charm of variation, designed with charming freedom.

We find through this later nineteenth-century period some of our best examples of architectural modeling, an appreciation and use of the art of the sculptor, and in some cases a use of color tone so delicately beautiful that we are almost impressed that the author wrought with unlimited palette.

There came before me recently excellent photographs, in some detail, of Tremont Temple, Boston, Mass., designed and erected in 1894 by Architects Blackall and Newton. Familiar with its every detail in design and execution, it immediately ranked itself in my mind among these nineteenth-century classics in clay well worthy of consideration.

Architecturally the building is frank and convincing of purpose. A city building on expensive property, located for convenience of many people, devoted to personal religious work as well as propaganda and executive direction. Logically we find two lower stories devoted to entrances, one quite sufficiently monumental, and stores capable of yielding high rentals — wise financing. Above, for a space equal to at least five stories, occurs a great wall with few fenestrations, saying auditorium in plain language. Surmounting this, the temple of pure Greek order and classic proportion, typifying, I assume, the tenets of the inspiration of the order coming to us through the ages. Of excellent detail throughout, more particularly would I dwell on its merit as a clay classic and appreciate the spirit in which its designer thought and wrought. Feeling the necessity for color interest in the great plain wall, which is the dominating feature of the façade, how natural to vision that most beautiful south façade of the Doge's Palace in Venice. This diapered mosaic of rare and costly marble, drawing for its range of tone upon the many since famous quarries of Northern Italy, and all softened and blended by the weathering of centuries of time, and withal impossible in Boston in the nineteenth century for immediate criticism.

Detail of Modeling Designed and Executed in Full Appreciation of the Plastic Art

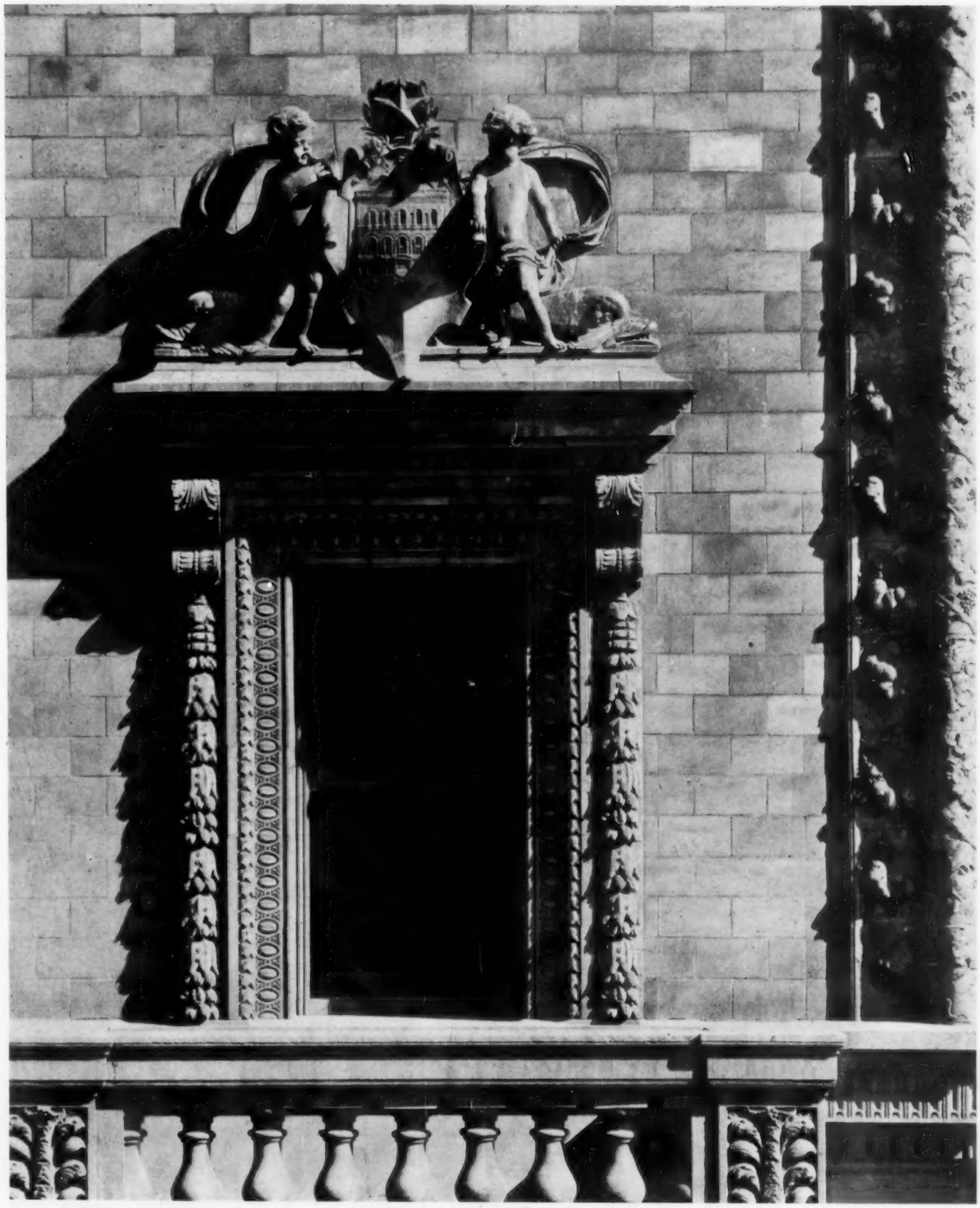
Can it be wrought in clay? The palette of experimental tones in unglazed ware was found to contain many of the elements of tonal charm occurring in the old marbles, and appreciatively the architects designed this great mosaic in units, memory says, about 8 by 12 inches, patterned by form and tones in great diamonds. Schemed in varying shades of soft grays, buffs, ivories and cream white, there were introduced at intervals, notes of delicate rose, subdued greens and gray blues. The entire

mosaic was then laid out, studied and harmonized from a scaffold some 30 feet above it, and with intensely interested care and sympathy and patience between artist and artisan the material was changed and adjusted and arranged to create the subtle veil of the weathering, from the stronger and more defined patterning of tones of the lower right hand of the mass to the almost undefined variations of the soft grayed ivories of the diagonally opposite corner of the wall. The whole effect is as of a grayish mist over a matrix of rich but low and subdued tones of ivory, orange, rose, green and blue.

The architectural trim is of an unglazed surface of a soft cream tone now weathered to ivory. The technical details of jointing and construction were carefully studied with due regard to physical limits of the material and economy of cost. Full advantage was taken of one of the strongest merits of terra cotta, in the free and luxurious use of ornament without the necessary increase in cost involved when used on stone.

All of the ornament was modeled under the supervision of Domingo Mora, sculptor, philosopher, gentleman — a man whose high ideals in art are recorded in many enduring monuments in burned clay. The charming figure pediments, capping the enriched windows over side entrance motifs, are his personal work, as are the two beau-

The large central window at fourth story is most exquisite in detail, intelligently interpreted in the clear, crisp and plastic modeling of the architrave, well foiled by the very formal surmounting acroteria.



A Detail of Balcony Window, Tremont Temple, Boston, Mass.

Note plastic treatment of modeling, well illustrated by the wall shadow. The modeling on the architrave surrounding mosaic is in beautiful scale to emphasize architectural members.

Blackall & Newton, Architects

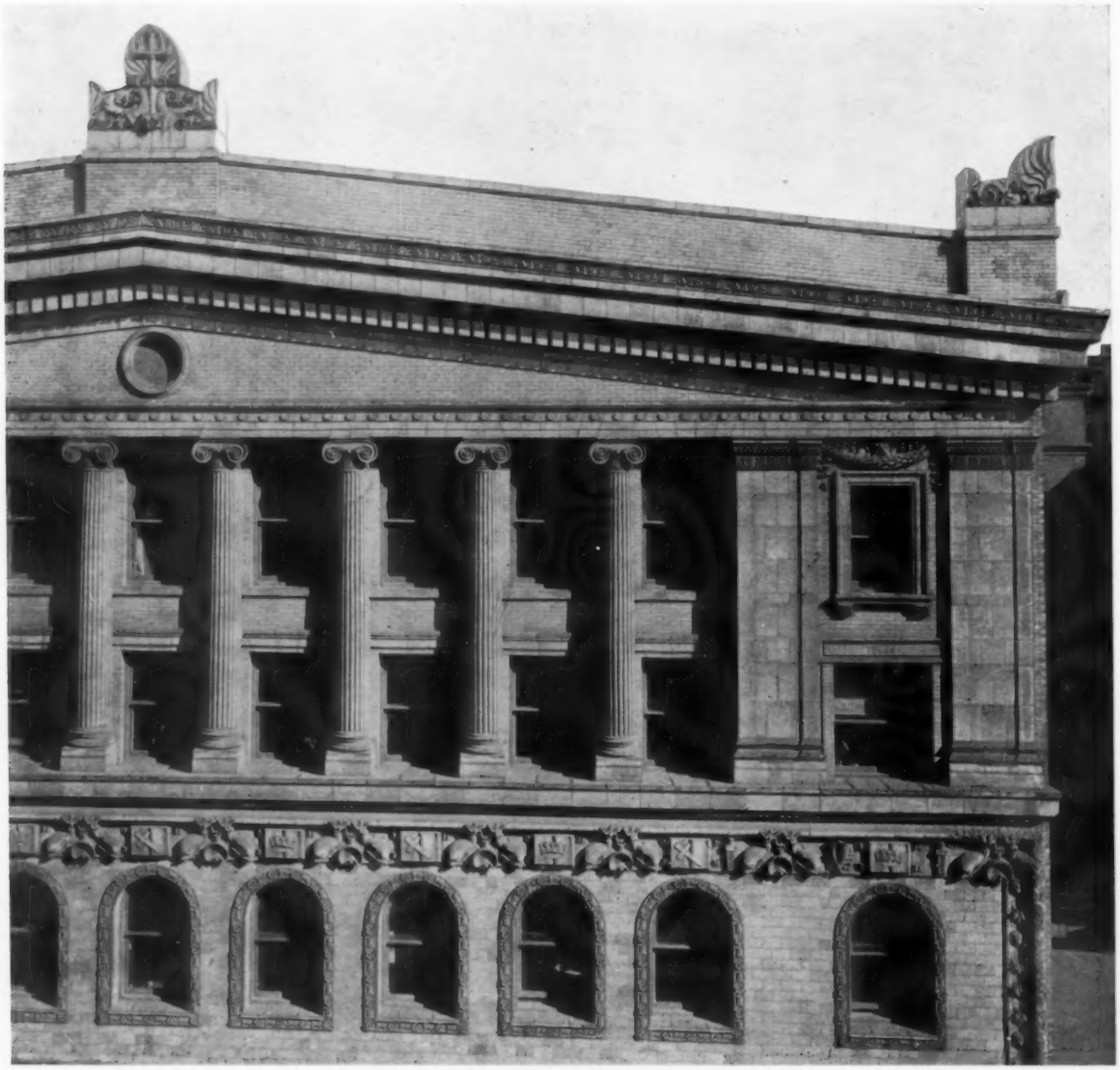
tiful boy figures supporting shields at spring of arch of central window and balcony feature.

The details of ornament and its interpretation by the modelers are brilliant, crisp, full of color and play of lights and shadows, denoting a full appreciation of the plastic medium.

Frequently, in considering some of our recent examples of remarkably fine terra cotta work, inspired ofttimes by monuments and precedents in stone, in great units, of uncompromising line, demanding technical skill and perfection which the craft is meeting with wonderful success, I question whether we are not passing unnoticed an opportunity for the creation of classics in clay, and in architecture by a failure to think in the terms of the medium employed. Glazed surfaces are a most valuable development in ceramic art where appropriately used, but are very frequently and unnecessarily applied to the detriment of exquisite form and modeling.

An unglazed surface leaves the full value of the modeling, giving the subtle feeling that lends life, color and individuality, and weathering more freely, it frequently gains interest in tone.

And may not we, too, add interest and beauty to our architecture by recalling and studying the work of these nineteenth-century masters, designing with more freedom in the use of ornament and modeling, and using more care in its design and execution?—(*Adv't*) *Atlantic Terra Cotta Co.*



Detail of sixth story window architrave with beautifully composed dolphin frieze above. Intermediate planes emphasize the colorful modeling of the dolphin groups. The more formal temple details above, true to precedent, possess added interest in the sharp shadows foiled by the graceful change of plane in the modeling of the free ornament.

THE WAR DEPARTMENT OF
THE UNITED STATES OF AMERICA
RECOGNIZES IN THIS AWARD FOR DISTINGUISHED SERVICE
THE LOYALTY ENERGY AND EFFICIENCY IN THE PERFORMANCE
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AND ROYAL AUSTRO-HUNGARIAN GOVERNMENT

SECRETARY OF WAR.

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DIRECTOR OF MUNITIONS

Selected List of Manufacturers' Literature

FOR THE SERVICE OF ARCHITECTS, ENGINEERS, DECORATORS AND CONTRACTORS

The publications listed in these columns are the most important of those issued by leading manufacturers identified with the building industry. They may be had without charge, unless otherwise noted, by applying on your business stationery to *The Architectural Forum*, 142 Berkeley St., Boston, Mass., or the manufacturer direct, in which case kindly mention this publication.

Listings in this Department are available to any manufacturer at the rate of $5 per listing per month.

BOILERS—See Heating Equipment

BRICK

American Enameled Brick and Tile Co., 52 Vanderbilt Avenue, New York.
Enameled Brick. Circular. Illustrated.
Fire Brick. Circular. Illustrated.

American Face Brick Association, Dept. BJ-6, 1151 Westminster Building, Chicago, Ill.
The Story of Brick. Booklet. 7 x 9¼ in. 55 pp. Illustrated. Presents the merits of face brick from structural and artistic standpoints. Tables of comparative costs.
The Home of Beauty. Booklet. 8 x 10 in. 72 pp. Color plates. Presents fifty designs for small face brick houses submitted in national competition by architects. Text by Aymar Embury II, Architect.

Bradford Brick Co., Bradford, Pa.
"Red" Catalog. 75/16 x 5 in. 30 pp. Illustrated. Covers dry pressed and impervious smooth-faced brick.

Common Brick Manufacturers Association of America, 1312 Schofield Bldg., Cleveland, Ohio.
Brick for the Average Man's Home. Book. 8½ x 11 in. 72 pp. Color plates. Book of plans for bungalows, houses and apartments for which working drawings are available. Price $1.00.
Brick—How to Build and Estimate. Book. 8½ x 11 in. 48 pp. Illustrated. A manual for the brick builder on estimating and details of brick construction. Price 25c.

Western Brick Co., Danville, Ill.
The Art of Stippling. Booklet. 4 x 6 in. 24 pp. The history of developing of stippling and its application to face brick.

CEMENT

Atlas Portland Cement Company, The, 30 Broad Street, New York.
Color Tones in Stucco. Booklet. 8½ x 11 in. 24 pp. Color plates. Describing the possibilities of toning stucco by the use of color aggregates. Examples and specifications.
Non-Staining Mortar for Pointing, Setting and Backing. Booklet. 8½ x 11 in. 28 pp. Illustrated. A treatise on good mortar. Specifications.
Cast Stone. Booklet. 8½ x 11 in. 28 pp. Illustrated. Showing some of the possibilities of cast stone.
Appropriate War Memorials. Booklet. 8½ x 11 in. 12 pp. Illustrated. Examples of what has been done in concrete and cast stone.

Muller, Franklyn R. Co., Waukegan, Ill.
Everlastic Magnesite Stucco. Booklet. 8½ x 11 in.

Sandusky Cement Co., Engineers' Building, Cleveland, Ohio.
Medusa White Portland Cement, Stainless. Booklet. 8½ x 11 in. 48 pp. Illustrated.
Medusa Waterproof White Portland Cement. Booklet. 6 x 9 in. 32 pp. Illustrated.
Medusa Review. 6 x 9 in. 18 pp. Illustrated. House organ issued bi-monthly.

United States Materials Co., Weed Street and Sheffield Avenue, Chicago, Ill.

American Materials Company, 101 Park Avenue, New York; Weed Street and Sheffield Avenue, Chicago, Ill.
Elastica, the Stucco of Permanent Beauty. Catalog. 8½ x 11 in. 32 pp. Illustrated. Treatise on composition and application of Elastica Stucco.

CONDUIT

National Metal Molding Co., 1113 Fulton Building, Pittsburgh, Pa.
Bulletin of all National Metal Molding Products. In correspondence folder. 9½ x 11½ in.
Sherarduct. Circular. 5 x 8 in. Illustrated.
Flexsteel. Circular. 5 x 8 in. Illustrated.

CONSTRUCTION, FIREPROOF

General Fireproofing Co., The, Youngstown, Ohio.
Fireproofing Handbook. Catalog. 6 x 9 in. 112 pp. A book dealing with the problems of fireproof construction, using as a basis the reinforcing materials—Self-Sentering, Truscet and Expanded Metal.
General Fireproofing. 8½ x 11 in. 16 pp. House organ issued monthly.

National Fire Proofing Co., Fulton Building, Pittsburgh, Pa.
Standard Fire Proofing Bulletin 171. 8½ x 11 in. 32 pp. Illustrated. A treatise on fire proof floor construction.

Northwestern Expanded Metal Co., 934 Old Colony Building, Chicago, Ill.
Fireproof Construction. Catalog. 6 x 9 in. 72 pp. Illustrated. Handbook of practical suggestions for architects and contractors. Describing Nemco Expanded Metal Lath.

Republic Fireproofing Co., 26 Cortlandt Street, New York.
Republic Fireproofing Construction for Buildings. Booklet. 8½ x 11 in. 28 pp. Illustrated. A complete description on the two-way construction, its lightness, distribution of loads, saving of loads, saving in structural steel or concrete and its general adaptability to Fireproof Construction.

DOORS, WINDOWS AND TRIM, METAL

Merchant & Evans Co., 2019 Washington Avenue, Philadelphia, Pa.
Evans "Almetl" Fire Doors and Shutters. Catalog. 8½ x 10¾ in. 24 pp. Describes the entire line including "Star" Ventilators.

DOORS, WINDOWS AND TRIM, WOOD

Curtis Service Bureau, 503-603 S. Second Street, Clinton, Iowa.
Architectural Exterior and Interior Woodwork, Standardized. Catalog. 9 x 11½ in. 238 pp. Illustrated. Covers a complete line of architectural woodwork, standardized both as to designs and sizes. Builders are requested to apply through their dealer.

Morgan Sash and Door Co., Chicago, Ill.
The Door Beautiful. Catalog. 8½ x 11 in. 50 pp. Color plates. Showing doors in appropriate interior settings.
Masterpieces of Doorcraft. Catalog. 6⅞ x 8 in. 23 pp. Color plates. Doors and types of architecture for which they are appropriate.
Adding Distinction to the Home. Catalog. 5 x 7½ in. 32 pp. Illustrated. Showing a number of entrances, various uses of French doors, mirror doors, flush doors, etc.

Reliance Fireproof Door Co., 47 Milton Street, Brooklyn, N. Y.
Reliance Fireproof Doors. Catalog. 6¼ x 9¼ in. 44 pp. Illustrated. Contains details of door and window construction, including molding and trim dies.

Stearns Lumber Co., A. T., Neponset, Mass.
Catalog "K." 9 x 12 in. 80 pp. Illustrated. Covering the entire line of exterior and interior finish, including Stearns' "Florida-Gulf" Cypress.

DUMBWAITERS

Kaestner & Hecht Co., Chicago, Ill.
Bulletin 520. Describes K. & H. Co. electric dumbwaiters. 8 pp.

Sedgwick Machine Works, 151 West 15th Street, New York.
Catalog and Service Sheets. Standard specifications, plans and prices for various types, etc. 4¼ x 8¼ in. 60 pp. Illustrated.

ELECTRICAL EQUIPMENT

General Electric Co., Schenectady, N. Y.
G. E. Specialty Catalog. 3¼ x 4½ in. 210 pp. Illustrated. Pocket size descriptive booklet with cloth binding. Gives dimensions, catalog numbers, capacities, package weights, etc., of a complete line of essential wiring devices.
Standard Unit Switchboard Panels. Booklet. 8 x 10½ in. Illustrated. An index to types of standard unit panels for large and small plants, alternating current and direct current, giving references to descriptive bulletins on each type.

Habirshaw Electric Cable Company, Inc., 10 East 43d Street, New York.
Plans and Specifications for the Home Electrical. Catalog. 11 x 14 in. 20 pp. Rubber, oiled paper, varnished cambric insulated wires and cables for every condition of service.

Hart & Hegeman Mfg. Co., The, 342 Capitol Avenue, Hartford, Conn.
Catalog "P." 4¾ x 6¼ in. 183 pp. Illustrated. H. & H. Switches and Paiste Wiring Materials.

Prometheus Electric Co., 511 West 42nd Street, New York.
Electrical Equipment. Booklet. 6 x 9 in. 5 pp. Illustrated. Electric plate warmers, sterilizers and mechanical heating devices.

Simplex Wire & Cable Co., 201 Devonshire Street, Boston, Mass.
Simplex Manual. Catalog and reference book. 6¾ x 4¼ in. 92 pp. Contains in addition to information regarding Simplex products, tables and data for the ready reference of architects, electrical engineers and contractors.

Western Electric Co., 195 Broadway, New York.
Western Electric Electrical Supply Year Book. Catalog. 6½ x 9½ in. 1248 pp. Illustrated. Listing equipment for every electrical need for homes, institutions, office buildings and industrial plants. Prices for estimating included.
Western Electric Flip Switches. Folders. Illustrated. Listing a complete line of lighting switches operated by levers thrown up or down.
Western Electric Decorations for Duplexalites. Booklet. 6½ x 9½ in. 8 pp. Illustrated. Listing a great variety of shades and decorations in parchment, silk, etc., for standard Duplexalites.

ELEVATORS

Kaestner & Hecht Co., Chicago, Ill.
Bulletin 500. Contains 32 pp. Giving general information on passenger elevators for high buildings.

Sedgwick Machine Works, 151 West 15th Street, New York.
Catalog and descriptive pamphlets. 4¼ x 8¼ in. 70 pp. Illustrated. Descriptive pamphlets on hand power freight elevators, sidewalk elevators, automobile elevators, etc.

FENCES

American Fence Construction Co., 106 Church Street, New York.
Afco Factory Fences. Booklet. 9 x 12 in. 32 pp. Illustrated.
Residential Fences. Booklets. 7 x 2½ in. Illustrated. A series of booklets on residential fences consisting of photographs, productions and brief descriptions.

FIRE DOORS—See Doors, Windows and Trim, Metal

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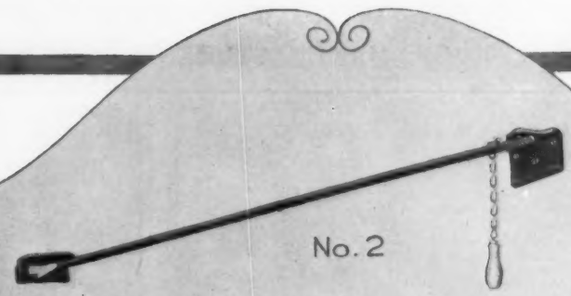

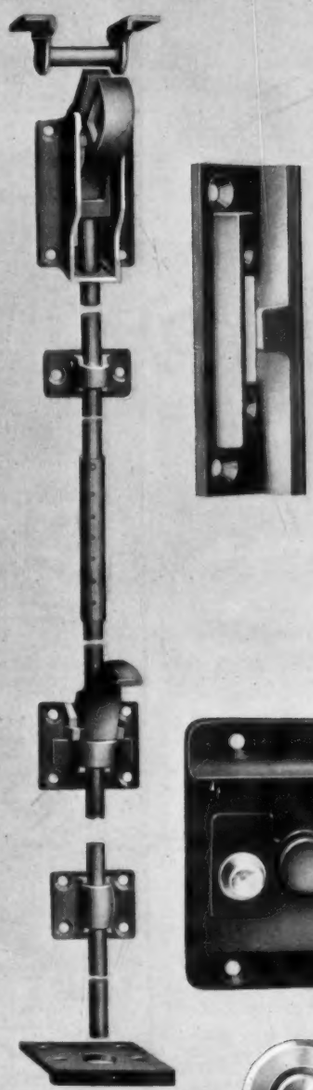

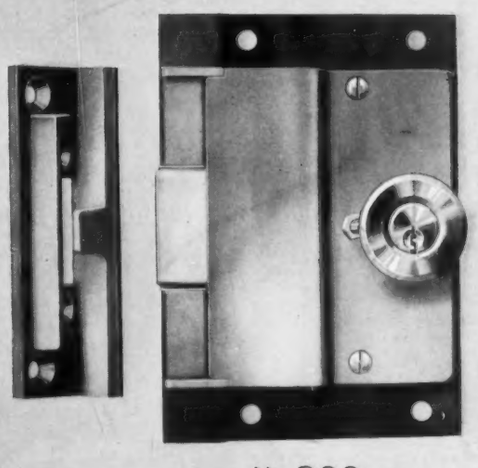

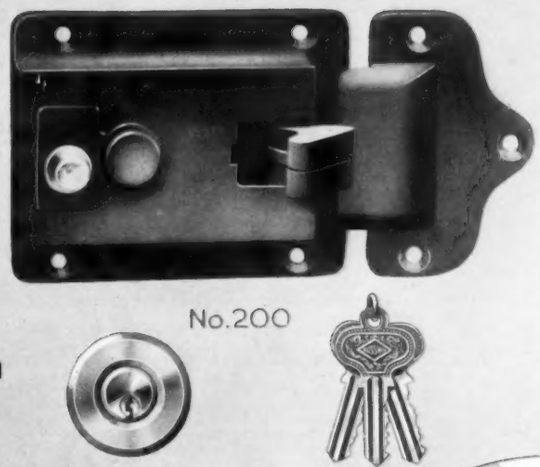

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 52*

FLOORING

Armstrong Cork Co., 132 West 24th Street, Pittsburgh, Pa.
Linotile Floors. Catalog. 6 x 9 in. 40 pp. Color plates. Describes Linotile, a composition of ground cork, wood flour, linseed oil and various gums and pigments in tile form.
The Ten-Point Cork Floor. Booklet. 3½ x 6 in. 16 pp. Shows design panels in color for Cork Tile floors.

Armstrong Cork Co. (Linoleum Dept.), Lancaster, Pa.
Armstrong's Linoleum Floors. Catalog. 8½ x 11 in. 54 pp. Color plates. A technical treatise on linoleum, including tables and specifications for installing linoleum floors.
The Artistic Possibilities of Armstrong's Linoleum Floors. Booklet. 11¼ x 16½ in. 12 pp. Color plates.
Armstrong's Linoleum Pattern Book, 1920. Catalog. 3½ x 6 in. 176 pp. Color plates. Reproductions in color of all patterns of linoleum and cork carpet in the Armstrong line.
Quality Sample Book. Three books. 3½ x 5¾ in. Showing all grades and thicknesses in the Armstrong line of linoleum and cork carpets.

Johns-Manville Co., H. W., New York City.
A Flooring That's "Made to Fit." Booklet. 3½ x 6 in. 14 pp. Illustrated. Descriptive of Johns-Manville Asphalt Mastic Flooring.

Muller Co., Franklyn R., Waukegan, Ill.
Asbestone Composition Flooring. Circulars. 8½ x 11 in. Description and Specifications.

FLOOR HARDENERS

Anti-Hydro Waterproofing Co., 299 Broadway, New York.
Floor Hardening. Circular. 6½ x 8½ in. 4 pp. Describes an inexpensive method for producing permanently smooth, dustless and wearproof floors.

Sonneborn, Sons, Inc., L., 266 Pearl Street, New York.
Concrete and Lapidolith. Booklet. 5⅜ x 8⅛ in. 24 pp. Illustrated. Describing relation of Lapidolith chemical floor hardener to concrete construction.
Why Lapidolize? Booklet. 8½ x 11 in. 11 pp. Illustrated. Reasons why Lapidolith should be specified.
Lapidolith Specifications. Circular. 8½ x 10¾ in. 2 pp.

Truscon Laboratories, The, Cor. Caniff Avenue and Grand Trunk R. R., Detroit, Mich.
Agatex and Its Performances. Booklet. 8½ x 11 in. Describes the methods of hardening concrete floors by the application of a chemical which forms a new surface as hard as agate.

FURNACES—See Heating Equipment

GLASS CONSTRUCTION

Mississippi Wire Glass, 220 Fifth Avenue, New York.
Mississippi Wire Glass. Catalog. 3⅞ x 8½ in. 32 pp. Illustrated. Covers the complete line.

HARDWARE

Casement Hardware Co., The, Clinton and Madison Streets, Chicago, Ill.
The Casement Window Handbook. 4¼ x 5¼ in. 31 pp. Illustrated. Treatise on the outswung English casement window showing details of screen and inside operated adjusters.

McKinney Mfg. Co., Pittsburgh, Pa.
McKinney Cabinet Hardware. Catalog. 6 x 9 in. 32 pp. Illustrated. Describes complete line of hardware for cabinet and furniture work.
McKinney Hardware for Sliding Doors. Booklet. 6 x 9 in. 18 pp. Illustrated. Describes different types of sliding door hardware.

Newman Clock Co., Inc., 426 Broadway, New York.
Booklet. 4 x 6¾ in. 16 pp. Advantages and descriptions of the Newman Grille Portable Watch-clocks.

Russell & Erwin Mfg. Co., New Britain, Conn.
Russwin Hardware. Catalog. 8 x 11 in. 448 pp. Illustrated. Covers the complete line.
Russwin Period Hardware. Catalog. 6 x 9 in. 72 pp. Illustrated.
Russwin Window Hardware. Booklet. 6 x 9 in. 16 pp. Illustrated. Sash fixtures for casement sash.
Russwin Fire Exit Bolts. Booklet. 6 x 9 in. 16 pp. Illustrated.

Stanley Works, The, New Britain, Conn.
Wrought Hardware. Catalog. 6½ x 10 in. Color plates. Shows all of the Stanley Works products made of steel from their own mills.
Eight Garages and their Stanley Garage Hardware. Booklet. 5 x 6¾ in. 32 pp. Illustrated. Illustrations and floor plans of eight typical garages that have been correctly equipped with Stanley Garage Hardware.
Ball Bearing Butts. Booklet. BJ. 6. 5 x 7¼ in. 32 pp. Illustrated. Concise description of various butts manufactured.
Stanley Specially Designed Garage Hardware. Booklet. B-50. 6 x 9 in. 24 pp. Illustrated. Detailed pictures and descriptions of various garage hardware equipment.

Vonnegut Hardware Co.
Von Duprin Self-Releasing Fire Exit Devices. Catalog. 8 x 11 in. 41 pp. Illustrated.
"Saving Lives." Booklet. 3¼ x 6 in. 16 pp. Illustrated. A brief outline why Self-Releasing Fire Exit Devices should be used.

HEATING EQUIPMENT

American Radiator Co., 816 South Michigan Avenue, Chicago, Ill.
Engineers' Data Book. 8 x 10¾ in. 48 pp. Illustrated. Valuable engineering data for estimating heating and ventilating requirements.
Ventilation for Vento Heaters. Catalog. 8 x 10¾ in. 24 pp. Illustrated. Examples of installation.
Ideal Type "A" Boiler. Catalog. 6 x 8½ in. 46 pp. Illustrated. Describes this new type of boiler accompanied by charts and tables.

HEATING EQUIPMENT—Continued

James B. Clow & Sons, 534 S. Franklin Street, Chicago, Ill.
Gasteam Catalog. 6 x 9 in. 16 pp. Illustrated. New radiator using gas for fuel.

Abram Cox, American & Dolphin Streets, Philadelphia, Pa.
Catalog 73. 9 x 12 in. 40 pp. Illustrated. Covers the complete line.
Industrial Housing Circular. 8 x 10½ in. 12 pp. Illustrated. Modern industrial housing projects with specifications for heating equipment.

Gorton & Lidgerwood Co., 96 Liberty Street, New York.
Gorton Self-Feeding Boilers. Booklet. 4¼ x 7¼ in. 32 pp. Illustrated. Descriptions, specifications and prices.

Graver Corporation, East Chicago, Ind.
Hot Water Service Heaters. Booklet. 8½ x 11 in. 4 pp. Illustrated. Describing Graver vertical and horizontal service heaters which utilize exhaust steam for heating.

Kewanee Boiler Co., Kewanee, Ill.
Kewanee on the Job. Catalog. 8½ x 11 in. 80 pp. Illustrated. Showing installations of Kewanee boilers, water heaters, radiators, etc.
Catalog No. 73. 6 x 9 in. 35 pp. Illustrated. Describes Kewanee steel power boilers with complete specifications.
Catalog No. 74. 6 x 9 in. 35 pp. Illustrated. Describes Kewanee steel heating boilers with specifications.
Catalog No. 75. 8½ x 11 in. 6 pp. Illustrated. Specifications on Tabasco Water Heaters, Kewanee water heating garbage burners and Kewanee steel tanks.

Moline Heat., Moline, Ill.
Moline Heat. Catalog. 8½ x 11 in. 46 pp. Illustrated. Covers the complete line.
Moline Heat Supplement A. 8½ x 11 in. 32 pp. Illustrated. Moline Heat as applied to factories, central station, dry kiln heating, etc.

Page Boiler Co., The Wm. H., 141 West 36th Street, New York.
Page Boilers. Catalog. 4½ x 8 in. 84 pp. Illustrated. Descriptions, specifications and methods of installing Page Round and Square Sectional Boilers.
Monarch Smokeless Boilers. Circular. 8½ x 11 in. Illustrated. Describing the Monarch Down-draft Smokeless Boilers.

Pratt & Cady Co., Hartford, Conn.
Heaters and Pumps. Booklet. 6¼ x 3½ in. 12 pp. Illustrated. Covering feed water heaters, hot water generators, duplex and triplex power pumps.

Riverside Boiler Works, Cambridge, Mass.
Riverside Range Boilers and Tanks. Catalog. 6 x 3 in. 35 pp. Illustrated. Shows sizes regularly manufactured, methods of installation and descriptions of processes used in manufacturing.

H. B. Smith Co., Westfield, Mass.
General Boiler and Radiator Catalog. 4 x 7 in. 90 pp. Illustrated. Giving ratings, dimensions, capacities and working pressures.
Engineer's Data Ring Book. 4 x 7 in. 125 pp. Illustrated.
Architect's and Contractor's Binders. These binders are made up of 9½ x 11 in. folders of different kinds giving dimensions, price lists, and erecting directions on the different lines of our manufacture.

United States Radiator Corporation, Detroit, Mich.
The Complete Line. Catalog. 4¼ x 7¼ in. 255 pp. Illustrated. Contains important technical information of special interest to architects and heating engineers.
A Day's Work. Booklet. 3½ x 6 in. 20 pp. Suggestions from employees for the purpose of promoting service and good will.

Utica Heating Co., Utica, N. Y.
Imperial Boilers & Heating Supplies. Catalog. 3½ x 6½ in. 52 pp. Illustrated.
Imperial Super Smokeless Boilers. Loose leaf catalog. 8½ x 11 in. 24 pp.
Superior Warm Air Furnaces. Catalog. 4½ x 8 in. 36 pp. Illustrated.
New Idea Pipeless Furnaces. Circular. 8½ x 11 in. 4 pp. Illustrated.

HOISTS

Gillis & Geoghegan, 544 West Broadway, New York.
Man Saving Load Lifting. Booklet. 6 x 8¾ in. 8 pp. Illustrated. Labor saving service in the lifting or lowering of lighter loads, through the use of G. & G. Telescopic and Non-telescopic Hoists.
Removing Ashes. Booklet. 6 x 8¾ in. 6 pp. Illustrated. Removing ashes from boiler room directly to wagon by electrically operated Telescopic Hoists.

HOLLOW TILE—See Tile, Hollow

INSULATION

Armstrong Cork Co., 132 Twenty-fourth Street, Pittsburgh, Pa.
Nonpareil Corkboard Insulation. Catalog. 6 x 9 in. 152 pp. Illustrated. Describes use in cold storage warehouses and wherever constant low temperatures are necessary.
Nonpareil Cork Covering. Catalog. 6 x 9 in. 64 pp. Illustrated. Describes the insulation of cold pipes and tanks of all kinds.

Philip Carey Co., The, Cincinnati, Ohio.
Carey Asbestos and Magnesia Products. Catalog. 6 x 9 in. 72 pp. Illustrated.

Magnesia Association of America, 721 Bulletin Building, Philadelphia, Pa.
Defend Your Steam. Booklet. 7½ x 10 in. 80 pp. Illustrated. A treatise covering every phase of heat insulation.
Standard Specifications. Booklet. 8½ x 11 in. 12 pp. Specifications for the application of 85 per cent Magnesia pipe covering.
Better Heated Houses. Catalog. 6 x 3½ in. 12 pp. Illustrated.
Coal Saving Tables. Booklet. 6 x 3¼ in. 4 pp.

United States Mineral Wool Co., 280 Madison Avenue, New York.
Uses of Mineral Wool in Building. Catalog. 5¼ x 6¾ in. 23 pp. Illustrated.

The Interphone is a Great Convenience

This intercommunicating telephone is being used in thousands of homes, where it is constantly proving its value as a time and step saver. It has done more than any other device to simplify home management.

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Interphones are real telephones. Every one is of the highest quality throughout — in workmanship as well as material.

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Western Electric Company
Offices in All Principal Cities

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 54*

INCINERATORS

Kerner Incinerator Co., 595 Clinton Street, Milwaukee, Wis.
The Kernerator. Booklet. 5½ x 9¼ in. 40 pp. Illustrated. Descriptions, installations and testimonials.

JOISTS AND STUDS, PRESSED STEEL

General Fireproofing Co., Youngstown, Ohio.
Steel Lumber. Hand Book. 4 x 6½ in. 72 pp. Illustrated. Data on the use of Steel Lumber and Metal Lath for economical fireproof construction. Tables and Specifications.

The Hydraulic Steelcraft Co., Cleveland, Ohio
Steel Buildings. Catalog. 8½ x 11 in. 44 pp. Covering uses of Hydraulic Steel Buildings for various industries.
Forms for Concrete. Booklet. 8½ x 11 in. 8 pp. Describing Hydraulic Steel Arch Pans with Tables.

North Western Expanded Metal Co., 934 Old Colony Building, Chicago, Ill.
Pressed Steel Lumber Manual. Catalog. 6 x 9 in. 56 pp. Illustrated. Describes a new system of light weight fireproof construction.

Truscon Steel Co., Youngstown, Ohio.
Truscon Standard Buildings, 4th ed. Catalog. 8½ x 11 in. 40 pp. Illustrated. Erection details, cross-section diagrams and adaptations are given.
Truscon Structural Pressed Steel. Catalog. 8½ x 11 in. 24 pp. Illustrated. Information on Pressed Steel Beams and Joists for light occupancy buildings. Tables, specifications and views of installations.

KITCHEN EQUIPMENT

Aluminum Cooking Utensils Co., New Kensington, Pa.
Wear-Ever. Catalog. 6 x 9 in. 55 pp. Illustrated.

LATH, METAL AND REINFORCING

The Bostwick Steel Lath Co., Niles, Ohio.
Bostwick Steel Lath, Revised Edition 1920. Catalog. 9 x 11½ in. 28 pp. Illustrated. Covers the entire line. Drawings and Specifications.

General Fireproofing Co., Youngstown, Ohio.
Herringbone Rigid Metal Lath. Catalog. 8½ x 11 in. 32 pp. Illustrated. A treatise on the many uses of Metal Lath.
Trussit. Booklet. 6 x 9 in. 16 pp. Illustrated. Detailed descriptions on the use of Trussit as a reinforcement for Concrete.
Self-Sentering—A Reinforcement for Concrete Floors, Roofs and Walls. Booklet. 8½ x 11 in. 36 pp. Illustrated.

North Western Expanded Metal Co., 934 Old Colony Building, Chicago, Ill.
Designing Data. Catalog. 6 x 9 in. 94 pp. Illustrated. Describes most efficient use of Econo Expanded Metal Reinforcing.
Formless Concrete Construction. Catalog. 6 x 9 in. 80 pp. Illustrated. Describes use of T-Rib Chanelath, a form and reinforcing for concrete.

Truscon Steel Co., Youngstown, Ohio.
High Rib and Metal Lath. 18th ed. Catalog. 8½ x 11 in. 64 pp. Illustrated. Gives properties of laths, specifications, special uses and views of installations.

LIME

Kelley Island Lime & Transport Co., Leader News Building, Cleveland, Ohio.
The Perfect Finishing Lime. Catalog. 4½ x 7¼ in. 32 pp. Illustrated. Describes use and advantage of "Tiger Finish" and gives illustrations of several large jobs.
For Finish-Coat Plastering. Booklet. 3¼ x 6½ in. 12 pp. Illustrated.

LUMBER

Arkansas Soft Pine Bureau, 1551 Boyle Building, Little Rock, Ark.
Arkansas Soft Pine Handbook. 8½ x 11 in. 64 pp. Illustrated. Treatise on soft pine.
Arkansas Soft Pine. How to Finish and Paint it. Booklet. 5 x 7 in. 36 pp. Illustrated. Information on proper painting and finishing for outside work and inside trim.
The Home You Long For. Loose Leaf Folder. 8½ x 11 in. 36 pp. Illustrated. Contains 8 home designs, by Robert Seyfarth, Architect, Chicago. Illustrations include exterior and floor plans with architect's estimate.

American Hardwood Mfrs. Association. Room 1402, 14 Main Street, Memphis, Tenn.
Technical Information about Red Gum. Booklet. 6 x 9 in. 16 pp. Illustrated.
Red Gum Facts. Booklet. 5½ x 8½ in. 14 pp. Illustrated.
Oak Catalog. 6 x 9 in. 31 pp. Illustrated.

American Walnut Mfrs. Assoc.
American Walnut, the Choice of the Master Craftsman. Booklet. 7 x 9 in. 45 pp. Illustrated. The use of walnut in fine furniture and woodwork.
Specification Notes for American Walnut Interior Trim. 8½ x 11 in. 3 pp. Includes notes on the different styles of finish suitable for walnut.

California Redwood Association, 760 Exposition Building, San Francisco, Calif.
California Redwood Homes. Booklet. 6 x 9 in. 16 pp. Illustrated.
Specialty Uses of California Redwood. Booklet. 6 x 9 in. 24 pp. Illustrated.
California Redwood on the Farm. Booklet. 3¾ x 9¼ in. 40 pp. Illustrated.
How to Finish California Redwood. Booklet. 3¾ x 9¼ in. 16 pp. Illustrated. Formulae and instructions.

LUMBER — Continued

Long Bell Lumber Co., R. A. Long Building, Kansas City, Mo.
The Post Everlasting. Booklet. 10½ x 7½ in. 32 pp. Illustrated. Information regarding creosoted yellow pine fence posts, barn poles, paving blocks, etc.
Poles That Resist Decay. Booklet. 9¼ x 4 in. 16 pp. Illustrated. Poles for telegraph, telephone, high power transmission lines.

North Carolina Pine Association, 91 Bank of Commerce Building, Norfolk, Va.
Home Builders Book. 8½ x 11 in. 24 pp. Color plates. A book for the consumer, with plans and suggestions on attractive modern rooms.
Book of Interiors. 8½ x 11 in. 16 pp. Color plates. A book for the architect or consumer, showing many beautiful woodwork effects.
Architect's Specification Manual. 9½ x 11½ in. 8 pp. Illustrated.

METAL LATH — See Lath, Metal and Reinforcing

METALS

American Brass Co., Waterbury, Conn.
Price List and Data Book. Loose Leaf Catalog. 3⅞ x 7 in. 168 pp. Illustrated. Covers entire line of sheets, rods, tubes, etc., in various metals. Useful tables.
Price List and Tables of Weights of Seamless Brass and Copper Tubes. 4¼ x 6¾ in. 60 pp.
Price List No. 12. 4¼ x 6¾ in. 40 pp. Useful tables of weights and data pages for brass, bronze and nickel silver sheets, wire and rods.
Tobin Bronze. Catalog. 4¼ x 6¾ in. 304 pp. Illustrated. Describes its use and gives specifications.

American Sheet & Tin Plate Co., Frick Building, Pittsburgh, Pa.
Reference Book. Pocket Ed. 2½ x 4½ in. 168 pp. Illustrated. Covers the complete line of Sheet and Tin Mill Products.
Copper—Its Effect Upon Steel for Roofing Tin. Catalog. 8½ x 11 in. 28 pp. Illustrated. Describes the merits of high grade roofing tin plates and the advantages of the copper-steel alloy.
Apollo and Apollo-Keystone Galvanized Sheets. Catalog. 8½ x 11 in. 20 pp. Illustrated.
Research on the Corrosion Resistance of Copper Steel. Booklet. 8½ x 11 in. 24 pp. Illustrated. Technical information on results of atmospheric corrosion tests of various sheets under actual weather conditions.
Facts Simply and Briefly Told. Booklet. 8½ x 11 in. 16 pp. Illustrated. Non-technical statements relating to Keystone Copper Steel.
Black Sheets and Special Sheets. Catalog. 8½ x 11 in. 28 pp. Illustrated. Describes standard grades of Black and Uncoated Sheets, together with weights, bundling tables, etc.
Bright Tin Plates. Catalog. 8½ x 11 in. 16 pp.

METAL TRIM — See Doors, Windows and Trim, Metal

METAL WORK, ORNAMENTAL

Hope & Sons, Henry, 103 Park Avenue, New York.
Hope's Leadwork Catalog. 9 x 12 in. 46 pp. Illustrated.

Polachek Bronze & Iron Co., John, 476 Hancock Street and 575 Boulevard. Long Island City, N. Y.
Honor Roll Tablets, Memorial Tablets and Monuments in Bronze. Booklet. 6 x 9 in. 28 pp. Illustrated.
Distinctive Metal Work. Booklet. 8½ x 11 in. 8 pp. Illustrated.
Special Design Portfolio. Looseleaf Catalog. 6 x 9 in. 32 pp. Illustrated. Informations as to size, number of names or letters accommodated on Memorial Tablets.

NURSERIES

Bobbink & Atkins, Rutherford, N. J.
Nursery Catalog. 10 x 7 in. 82 pp. Illustrated.
Home Grounds Book. 7¾ x 5½ in. 50 pp. Illustrated. Concise explanatory notes on residential landscape work.
World's Choicest Roses. Catalog. 7 x 10 in. 32 pp. Illustrated. Complete list of roses hardy in Northern States.

The Davey Tree Expert Co., Kent, Ohio.
When Your Trees Need the Tree Surgeon. Booklet. 9¼ x 8 in. 16 pp. Illustrated.

OFFICE SUPPLIES

H. Reeve Angel, Inc., 711 Spruce St., New York.
Drawing Papers. Sample Book. 3½ x 5½ in. Showing all the surfaces and substances in general demand.

American Lead Pencil Co., 220 Fifth Avenue, New York.
Venus Pencil in Mechanical Drafting. Booklet. 6 x 9 in. 16 pp. Illustrated.
Venus Pencil in Your School. Booklet. 6 x 9 in. 16 pp. Illustrated.

Joseph Dixon Crucible Co., Pencil Dept., 224 J. Jersey City, N.J.
Finding Your Pencil. Booklet. 6¼ x 3¼ in. 16 pp. Illustrated.
The First Five. Booklet. 3½ x 5¼ in. 10 pp. Illustrated.
A Study in Sepia. Booklet. 7 x 4½ in. 5 pp. Illustrated.

Eberhard Faber Co., 37 Greenpoint Avenue, Brooklyn, N. Y.
Eberhard Faber Pencils, How They Are Made. Booklet. 4¾ x 6¾ in. 23 pp. Illustrated.

N. Y. Blueprint Paper Co., 102 Reade St., New York.
Catalog of Drawing Materials, Mathematical and Engineering Instruments. 4 x 6 in. 400 pp. Illustrated. Covers the complete line.

Equipped with The Stanley Works Ball Bearing Butts. Michigan Avenue Building, Chicago, Ill.

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STRENGTH

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THE STANLEY WORKS
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NEW BRITAIN, CONN.
NEW YORK CHICAGO

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 56*

PAINTS, STAINS, VARNISHES AND WOOD FINISHES

Boston Varnish Co., Everett Station, Boston, Mass.
The Inviting Home. Booklet. 5½ x 9 in. 16 pp. Color Plates. A briefly worded book on painting for the busy architect or decorator.
The White Enamel Specification Book. 6 x 9 in. 12 pp. Explaining the use of Kyanize White Enamel on interior or exterior surfaces.

Cabot, Inc., Samuel, Boston, Mass.
Cabot's Creosote Stains. Booklet. 4 x 8½ in. 16 pp. Illustrated.

Creo-Dipt Company, Inc., North Tonawanda, N. Y.
Dixie White. Folder. 3½ x 8 in. 3 pp. Illustrated. A heavy white stain which produces the whitewashed effect.

Devoe & Raynolds Co., Inc., 101 Fulton Street, New York.
Architectural Finishes. Catalog. 5 x 7 in. 40 pp. Specifications and suggestions for painting, varnishing, staining and enameling.
Harmony in the Home. Booklet. 4½ x 6 in. 24 pp. Illustrated. Flat finish wall paints, color suggestions and specifications.

The Eagle-Picher Lead Co., 208 S. La Salle Street, Chicago, Ill.
Protective Coatings for Structural Metals. Book. 6 x 9 in. 48 pp. Illustrated.

Fox Co., M. Ewing, New York, N. Y.
Calcimines. Booklet. 3¼ x 6¼ in. 8 pp. Color cards.
Water Paints. Booklet. 3¼ x 6¼ in. 6 pp. Color cards.

Murphy Varnish Co., The, Chicago, Ill.
Beautiful Floors and How to Care for Them. Booklet. 3⅜ x 6¼ in. 16 pp. Illustrated.
Murphy Varnish. Booklet. 3⅜ x 6¼ in. 12 pp. Illustrated. Advantages of Waterproof Varnishes.
How to Have a Modern Bathroom. Booklet. 3⅜ x 6¼ in. 4 pp. Illustrated.
Modern Sanitary Kitchen. Booklet. 3⅜ x 6¼ in. 4 pp. Illustrated.

O'Brien Varnish Co., 1120 Washington Avenue, South Bend, Ind.
That Magic Thing Called Color. Booklet. 5½ x 8½ in. 24 pp. Illustrated. Short treatise on the use of color in the home, special reference to walls and ceilings.
Architects' Specification Manual. 8½ x 11 in. 50 pp. Complete specifications for all paint products.

The Sherwin-Williams Co., 601 Canal Road, Cleveland, Ohio.
A Book of Painting and Varnishing Specifications. 8½ x 11 in. 30 pp. A text book on painting and finishing.
Announcement of Sherwin-Williams Flat-Tone Multi-Color Effects. Booklet. 2½ x 6 in. 10 pp. Illustrated. Development of a new system of wall decoration.
Monthly Architectural Bulletin. 8½ x 11 in. Bulletin issued periodically on painting and finishing.

Sonneborn Sons, Inc., L., Dept. 4, 264 Pearl Street, New York.
Paint Specifications. Booklet. 8½ x 10¾ in. 4 pp.

Truscon Laboratories, The, Cor. Caniff Avenue and Grand Trunk R. R., Detroit, Mich.
Spread the Sunshine Inside. Booklet. 5 x 8 in. 24 pp. Describes methods for light saving by the application of light reflecting enamels to interior walls of factories and workrooms.

Wadsworth-Howland Co., Inc., Boston, Mass.
Paints and Varnishes. Catalog. 5¾ x 8½ in. 140 pp. Illustrated. Covers the complete line.

PIPE

A. M. Byers Co., Pittsburgh, Pa.
General Information for Pipe Users. Bulletin No. 26. 8½ x 11 in. 24 pp. Illustrated. Description of materials and processes employed in the manufacture of Byers Pipe. Contains many useful tables.
An investigation of Pipe Corrosion. Bulletin No. 30. 8½ x 11 in. 20 pp. Illustrated. A report of general interest to architects, engineers and builders.
Corrosion of Wrought Iron, Cast Iron and Steel Pipe in House Drainage Systems. Bulletin No. 32. 8½ x 11 in. 36 pp. Illustrated. Data obtained through investigations conducted in New York and Chicago.
The Installation Cost of Pipe. Bulletin No. 38. 8½ x 11 in. 32 pp. Illustrated. Cost analyses of 20 different pipe installations in power and industrial plants, office buildings, hotels, residences, etc.

James B. Clow & Sons., 534 S. Franklin Street, Chicago, Ill.
Catalog "A." 4 x 6½ in. 706 pp. Illustrated. Shows a full line of steam, gas and water works supplies.

National Tube Co., Frick Building, Pittsburgh, Pa.
National Bulletin No. 11, History, Characteristics and Advantages of National Pipe. Catalog. 8½ x 11 in. 48 pp. Illustrated.
National Bulletin No. 35. National Pipe in Large Buildings. Catalog. 8½ x 11 in. 88 pp. Illustrated.
National Bulletin No. 7, Manufacture and Advantages of National Welding Scale Free Pipe. Booklet. 8½ x 11 in. 16 pp. Illustrated.
National Bulletin No. 3, Prevention of Corrosion in Pipe. Booklet. 8½ x 11 in. 24 pp. Illustrated. Contains the results of carefully conducted investigations.

U. S. Cast Iron Pipe & Foundry Co., Burlington, N. J.
Keystone Columns. Architectural Service Sheet. 16½ x 21½ in. Illustrated. Standard specifications with description and formula for calculating cast iron building columns.

PLUMBING EQUIPMENT

Brunswick-Balke-Collender Co., 623 S. Wabash Avenue, Chicago, Ill.
Whale-bone-ite Seat. Booklet. 3½ x 6¼ in. 4 pp. Illustrated.
Whale-bone-ite Seat. Booklet. 3½ x 6¼ in. 8 pp. Illustrated.

PLUMBING EQUIPMENT — Continued

James B. Clow & Sons, 534 S. Franklin Street, Chicago, Ill.
Catalog "M." 9¼ x 12 in. 184 pp. Illustrated. Shows complete line of plumbing fixtures for Schools, Railroads and Industrial Plants.

Crane Company, 836 S. Michigan Avenue, Chicago, Ill.
Crane Products in World Wide Use. Catalog. 5 x 9½ in. 24 pp. Illustrated.
Plumbing Suggestions for Home Builders. Catalog. 3 x 6 in. 80 pp. Illustrated.
Plumbing Suggestions for Industrial Plants. Catalog. 4 x 6½ in. 43 pp. Illustrated.
No. 50 Steam Pocket Catalog. 4 x 6½ in. 775 pp. Illustrated. Describes the complete line of the Crane Co.

Thomas Maddock's Sons Co., Trenton, N. J.
Highest Grade Standardized Plumbing Fixtures for Every Need. Catalog. 5 x 7½ in. 94 pp. Illustrated. Covers the complete line.
Bathroom Individuality. Booklet. 6 x 9 in. 28 pp. Illustrated. Showing view of complete bathrooms with complete descriptions of floor plans.
Specifications for plumbing fixtures. Booklet. 9 x 12 in. 8 pp. Tables of specifications for industrial buildings, schools, apartments, hotels, etc.

Rundle-Spence Mfg. Co., Milwaukee, Wis.
Bubbling Fountains. Catalog. 5½ x 8 in. 74 pp. Illustrated.

PUMPS

Goulds Mfg. Co., The, Seneca Falls, N. Y.
Set of Twenty Bulletins. 7½ x 10⅝ in. 12 to 32 pp. each. Illustrated. Covers complete line of power and centrifugal pumps for all services.
Catalog "K." 6 x 9 in. 216 pp. Illustrated. Covers complete line of smaller size pumps.

REFRIGERATION

Isko Co., The, Chicago, Ill.
Electrical Refrigeration. Booklet. 8 x 3¼ in. 16 pp. Illustrated. Services and advantages of the household machine.
Bulletin No. 142. 8½ x 11 in. 4 pp. Illustrated. Isko electrical refrigeration for cooling drinking water systems.
Bulletin No. 140. 8½ x 11 in. 4 pp. Illustrated. Isko electrical refrigeration for both household and commercial use.

Johns-Manville Co., The H. W., Madison Avenue and 41st Street, New York, N. Y.
Johns-Manville System of Refrigeration. Booklet. 3½ x 6 in. 16 pp. Illustrated.

ROOFING

American Sheet and Tin Plate Co., Frick Building, Pittsburgh, Pa.
Better Buildings. Catalog. 8½ x 11 in. 32 pp. Illustrated. Describes corrugated and formed roofing together with table of weights and methods of application.

The Barrett Co., Chicago, Ill.
Barrett Everlastic Fiber Coating. Booklet. 3⅜ x 6 in. 8 pp. Illustrated. A new liquid cement for covering roofs and how to apply it.
Barrett Service Sheets. 8½ x 11 in. For architects, builders and contractors.

Philip Carey Co., The, Cincinnati, Ohio.
Architects' Specifications for Carey Building Material. 8½ x 11 in. 48 pp. Illustrated.

Creo-Dipt Company Inc., North Tonawanda, N. Y.
Thatch Roofs. Booklet. 8½ x 11 in. Illustrated. Showing the varied effects obtainable with Stained Shingles.

Johns-Manville Co., The H. W., Madison Avenue and 41st Street, New York.
Johns-Manville Asbestos Shingles. Booklet. 3½ x 6 in. 32 pp. Illustrated. Prices, construction data and specifications.
Johns-Manville Roofing and Building Materials. Catalog. 3½ x 6 in. 24 pp. Illustrated. Describes building materials such as asbestos wood, sound deadening and insulating felts, waterproofing, etc.

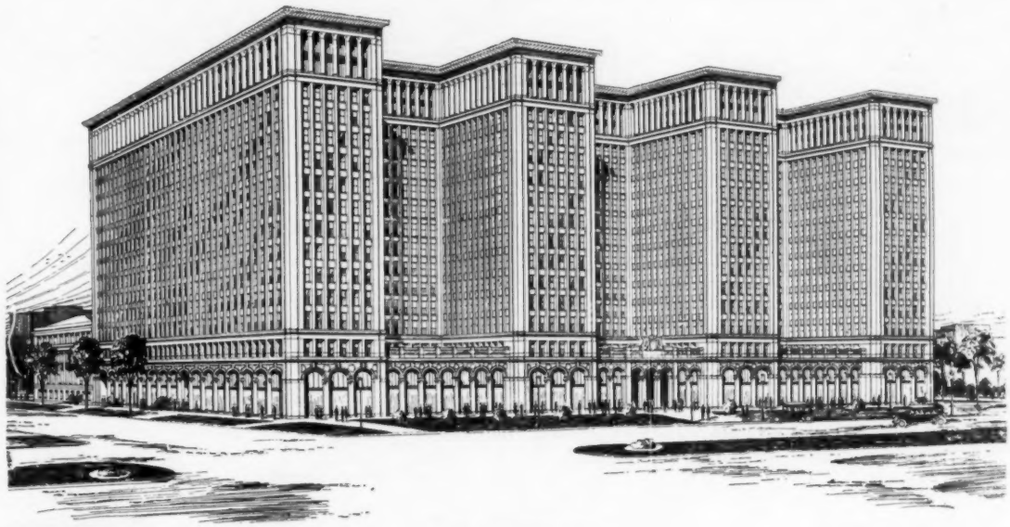
Keasbey & Mattison Co., Ambler, Pa.
Ambler Asbestos Shingles. Catalog. 5½ x 8½ in. 40 pp. Illustrated.
Ambler Asbestos Corrugated Roofing and Siding. Catalog. 8½ x 11 in. 36 pp. Illustrated. Standard Purlin Spacing Tables.
Ambler Asbestos Corrugated Roofing and Siding. Catalog. 8½ x 11 in. 20 pp. Illustrated. Prices and specifications.
Ambler Asbestos Building Lumber. Catalog. 8½ x 11 in. 32 pp. Illustrated.

Ludowici-Celadon Co., Chicago, Ill.
Roofing Tile. A Detailed Reference for Architects' Use. Handbook. 9 x 13 in. 106 pp. Illustrated. A working handbook for architects.
Roof Beautiful. Catalog. 6½ x 8½ in. 39 pp. Illustrated.
Folder No. 8. 3¾ x 9 in. 10 pp. Illustrated. A condensed catalog.

SEWAGE DISPOSAL

Kewanee Private Utilities, Kewanee, Ill.
Specification Sheets. 7¾ x 10¼ in. 46 pp. Illustrated. Detailed drawings and specifications covering water supply and sewage disposal systems.
Modernize Your Farm. Booklet. 7¾ x 10¼ in. 16 pp. Illustrated. Description of water systems and lighting equipment.

SHRUBS, TREES, ETC.—See Nurseries



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ALBERT KAHN, *Architect*

The building, sketch of which is shown above, is now in process of erection in Detroit. It has the distinction of being the largest office building in the world, and is being built exclusively for General Motors Corporation. We regard the selection of

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Locks and Hardware for the equipment of this mammoth structure as a testimonial not only to the worth of SARGENT goods, but also to our vast resources and manufacturing facilities. There are few hardware manufacturers equipped to handle an order of the size and complexity of this one with promptness and satisfaction to all parties concerned. Under all the circumstances perhaps a certain degree of pride on our part is pardonable.

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New York Chicago

Sargent Hardware is sold in all cities by representative dealers

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 58*

STORE FRONTS

Kawneer Mfg. Co., The, Niles, Mich.
Kawneer Solid Copper Store Fronts. Catalog "K." 8½ x 11 in. 32 pp. Illustrated. Information about various members used in the pioneer Kawneer construction.
Book of Designs. Catalog. 6 x 9 in. 64 pp. Illustrated.
New Jersey Terra Cotta Co., Singer Building, New York.
Store Front. Booklet. 8½ x 11 in. 20 pp. Illustrated.
Zouri Drawn Metal Co., Chicago Heights, Ill.
Key to Getting the People In. Catalog. 6 x 9 in. 68 pp. Illustrated. Zouri Safety Sash, corner and division bars have been approved by the Underwriters' Laboratories and are manufactured under their supervision.

STUCCO—See Cement, Portland.

STUCCO AND WALL BOARD

Philip Carey Co., The, Cincinnati, Ohio.
Carey Board for Better Building. Catalog. 6 x 9 in. 32 pp. Illustrated.
Bishopric Manufacturing Co., 988 Este Avenue, Cincinnati, Ohio.
Homes Built on the Wisdom of Ages. Catalog. 6 x 9 in. 48 pp. Illustrated. Describing the use of Bishopric stucco board and Bishopric sheathing board.

TELEPHONE, INTER-COMMUNICATING

Western Electric Co., 195 Broadway, New York.
Specification for W. E. Inter-phones and Private Telephone Systems. 8 x 10¾ in. 88 pp. Illustrated.

TILE, FLOOR AND WALL

Associated Tile Manufacturers, The, Beaver Falls, Pa.
Tile Floors and Walls for Hospitals. Booklet. 8½ x 11 in. 40 pp. Illustrated. Reasons for selecting Tile for hospitals.
Bring the Crowds to Your Market. Booklet. 8½ x 11 in. 16 pp. Illustrated. The use of Tile for the modern sanitary market.
Preparation for Tile. Booklet. 6 x 9 in. 32 pp. Illustrated. Describing the manner in which Tile is set and the various types of construction which are used as a foundation for the product.
Swimming Pools. Booklet. 8½ x 11 in. 32 pp. Illustrated. A handbook on swimming pools and their construction.

TILE, HOLLOW

Hollow Building Tile Association, Conway Bldg., Chicago, Ill.
Handbook of Hollow Building Tile Construction. 8½ x 11 in. 104 pp. Illustrated. Complete treatise on most approved methods of hollow tile building construction and fireproofing.

BOOKCASES *WITH* CHARACTER

IF this permanent bookcase fails to fit into your plans for a client and thereby save you labor of detailing, there are 15 other Curtis designs, one of which surely will. Curtis designs are an achievement—the result of the co-operation with us of Trowbridge & Ackerman, New York. May we tell you more about them?

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1866 CURTIS WOODWORK
"The Permanent Furniture for Your Home"

TILE, HOLLOW — Continued

National Fire Proofing Co., Fulton Building, Pittsburgh, Pa.
Standard Wall Construction Bulletin 174. 8½ x 11. 32 pp. Illustrated. A complete treatise on the subject of hollow tile wall construction.
Industrial Housing Bulletin 172, 8½ x 11 in. 14 pp. Illustrated. Photographs and floor plans of typical workingmen's homes.
Natco on the Farm. 8½ x 11 in. 38 pp. Illustrated. A treatise on the subject of fire safe and permanent farm building construction.

VALVES

Jenkins Bros., 80 White Street, New York.
The Valve Behind a Good Heating System. Booklet. 4½ x 7¼ in. 16 pp. Color plates.
Pratt & Cady Co., Inc., Hartford, Conn.
Valves. Catalog. 9 x 6 in. 221 pp. Illustrated. Covers the complete line.

VENTILATION

Clarage Fan Co., North Street, Kalamazoo, Mich.
Clarage Multiblade Fans. Catalog No. 51. 8½ x 11 in. 64 pp. Illustrated.
Type S. P. Exhaust Fans. Catalog No. 111. 8½ x 11 in. 36 pp. Illustrated.
Type C. I. Fans and Blowers. Catalog No. 112. 8½ x 11 in. 8 pp. Illustrated.
Type S. P. Blowers. Catalog No. 23. 8½ x 11 in. 20 pp. Illustrated.
Globe Ventilator Co., Troy, N. Y.
Globe Ventilator's Catalog. 6 x 9 in. 32 pp. Illustrated.
Moline Heat., Moline, Ill.
Univent. Catalog. 8½ x 11 in. 32 pp. Color plates. Ventilation in all its phases.
Architect's and Engineer's Univent Data Book. 8½ x 11 in. 32 pp. Illustrated. Technical information on ventilating.
Royal Ventilator Co., 415 Locust Street, Philadelphia, Pa.
Ventilation. Catalog. 4¾ x 9 in. 48 pp. Illustrated.

WATERPROOFING

Anti-Hydro Waterproofing Co., 299 Broadway, N. Y.
Waterproofing. Booklet. 3½ x 6 in. 4 pp. Methods used for waterproofing concrete and mortars.
The Barrett Co., Chicago, Ill.
Barrett Elastigum. Booklet. 3¾ x 8½ in. 8 pp. Illustrated. Describes elastigum, a waterproof cement, and its application to parapet walls.
Barrett No-Aer-Leeks. Booklet. 3¾ x 6 in. 8 pp. Illustrated. How it is applied to make air-tight and moisture proof walls around boiler settings.
Sandusky Cement Co., Dept. F, Cleveland, Ohio.
Medusa Waterproofing. Booklet. 6¾ x 9 in. 37 pp. Illustrated.
Truscon Laboratories, The, Cor. Caniff Avenue and Grand Trunk R. R., Detroit, Mich.
Structural Waterproofing. Book. 8½ x 11 in. 88 pp. Illustrated. A reliable and trustworthy text-book on modern waterproofing practice.
Truscon Stonetex. Booklet. 5 x 8 in. 36 pp. Illustrated. A booklet telling of methods to decorate and make brick, stucco and masonry free from stains by the application of a cement coating.
Wadsworth-Howland Co., Inc., Boston, Mass.
Bay State Waterproofings. Booklet. 8½ x 11 in. Illustrated. Methods of applying Cement Coating.

WATER SOFTENERS

Graver Corp., East Chicago, Ind.
Graver Zeolite Softeners. Bulletin 509. 8½ x 11 in. 16 pp. Illustrated. Water softeners for homes, institutions, hotels, apartments, etc.
Graver Vertical Pressure Water Feeders. Bulletin 502. 8½ x 11 in. 8 pp. Illustrated. Detailed description of parts, capacities and dimensions.
Graver Small Continuous Water Softener. Bulletin 507. 8½ x 11 in. 12 pp. Illustrated. A softener for raw water ice plants and small steam power plants.

WINDOW CORD

Samson Cordage Works, Boston, Mass.
Samson Spot Sash Cord. Booklet. 3¾ x 6¼ in. 4 pp. Illustrated.

WINDOWS, CASEMENT

Crittall Casement Window Co., 685 East Atwater Street, Detroit, Mich.
Catalog No. 18. 9 x 12 in. 56 pp. Illustrated.
Hoffman Mfg. Co., Andrew, 900 Steger Building, Chicago, Ill.
Hoffman Casements. Catalog. 5½ x 8 in. 8 pp. Illustrated. Miniature details and phantom drawings.
F. S. Details. 22 x 34 in. Full size working details for mill work and installation with isometric views.
Architects' Portfolio. 8½ x 11 in. Loose leaf circulars.
Hope & Sons, Henry, 103 Park Avenue, New York.
Catalog. 12¼ x 18½ in. 30 pp. Illustrated. Full size details of outward and inward opening casements.
International Casement Co., Inc., Jamestown, N. Y.
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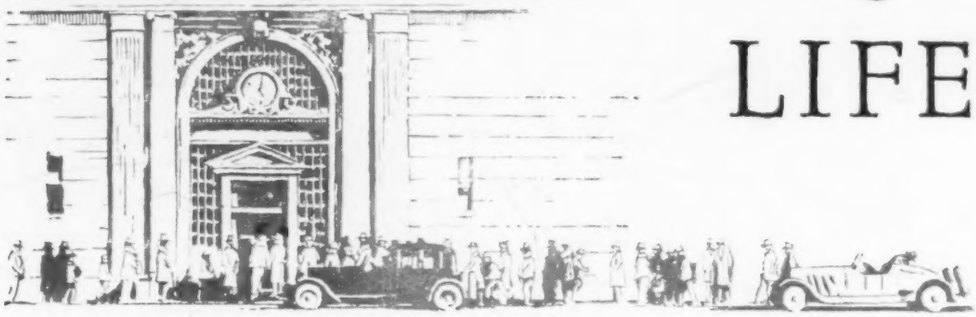

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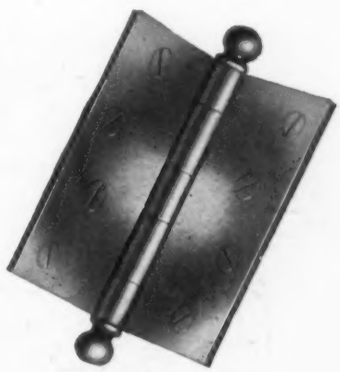

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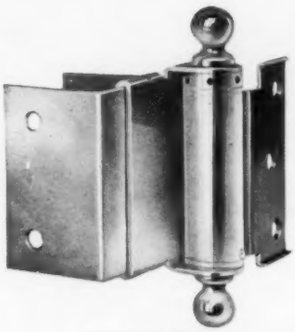
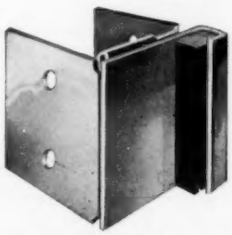


New 1800 Hinge

Architects and builders alike are enthusiastic in their endorsement of the new Lawson standard three-inch spring jamb hinges with adjustable bracket for use in place of the old style four-inch hinge and blank for lavatory work.

These three-inch hinges, having an adjustment range from 1⅛ in. to 1½ in., are adaptable to any construction and not only give a more snappy spring action, but make a better-looking job.



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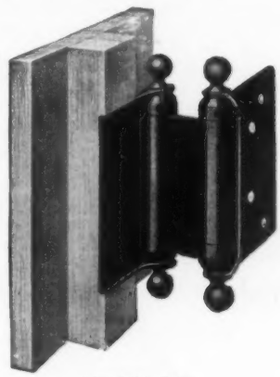
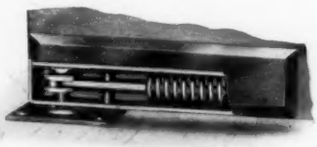


The Old Way

The new Lawson No. 800 Surface Floor Spring Hinge has already proved itself superior to any similar hinge. With the roller bearing at the top where it should be to carry the weight, this hinge has a smooth and snappy spring action at all times.



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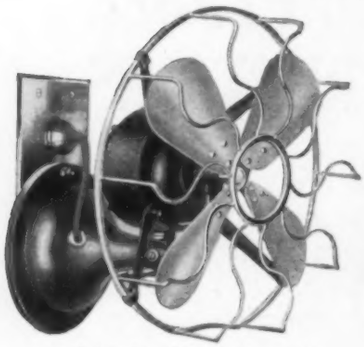

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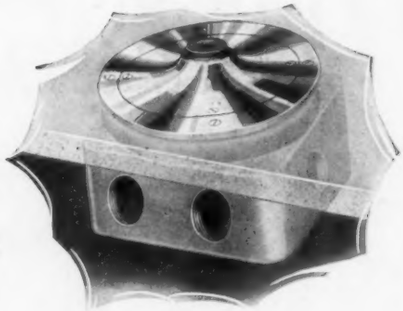

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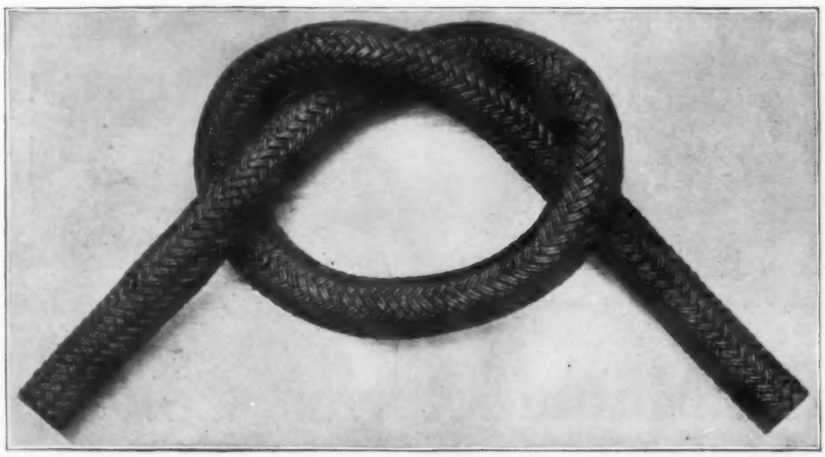

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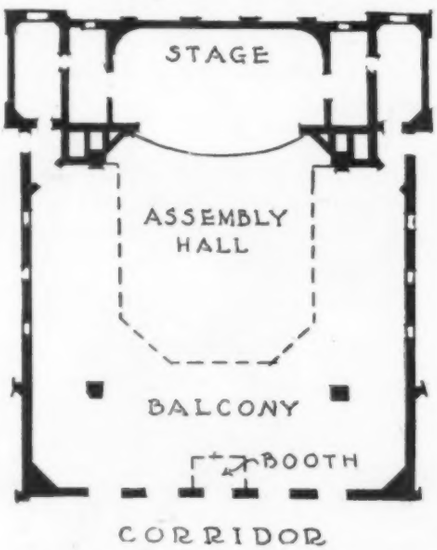
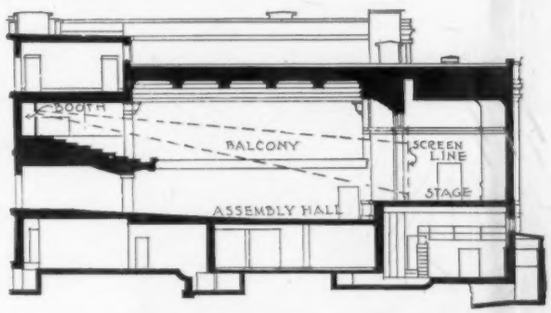


Plan of Auditorium with Balcony Indicated

Power's 6A Cameragraph Machine is used for motion picture projection in this school. This type of machine is especially adapted to school installation. The auditorium is 80 feet x 71 feet. A simple and inexpensive form of projection booth is constructed at the rear of the balcony. The stage is 44 feet x 22 feet.



Transverse Section Showing Relation of Projection Booth to Screen

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The architect's responsibility extends further than the mere design of the home. It includes, also, the proper choice of materials. He should keep in mind that artistic houses require attractive electrical equipment.

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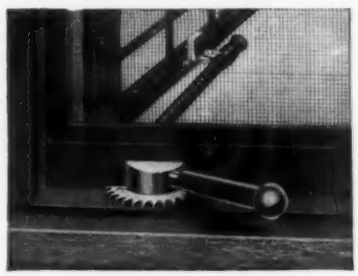
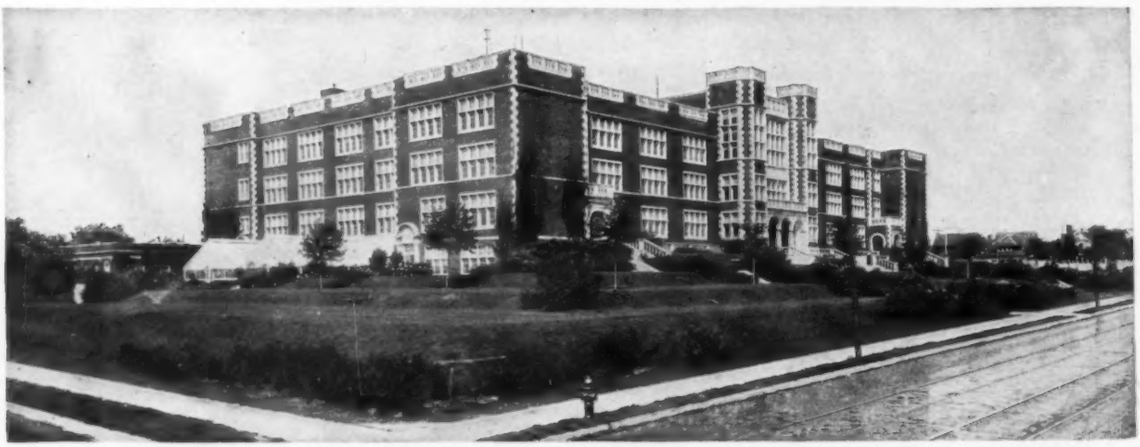


The "Bull-Dog" — a popular, simple type of inside operated adjuster



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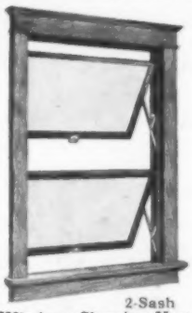

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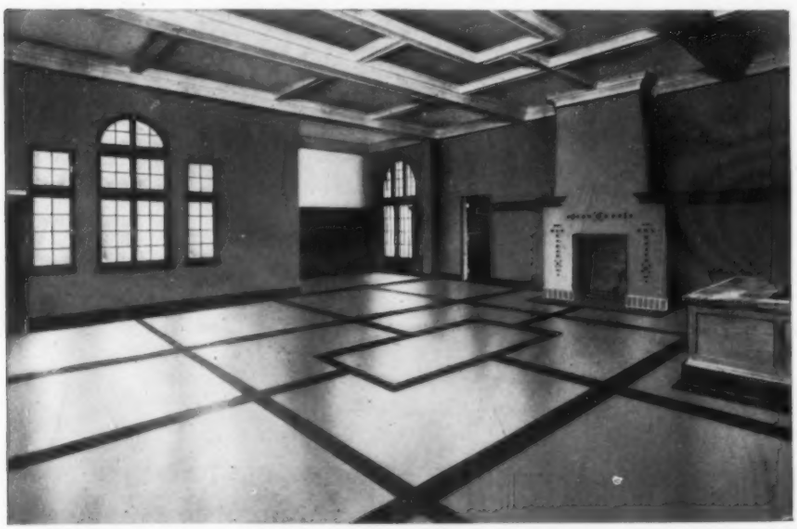

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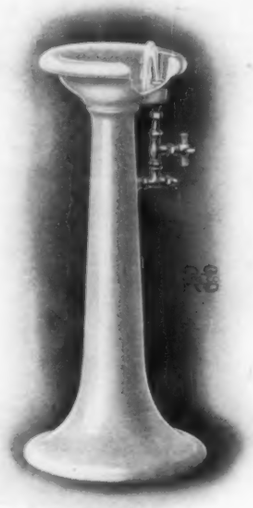

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Running Water Electric Light Sewage Disposal

to satisfied users outside the limits of public utilities. Let *our* reputation be behind *your utilities* specifications. Our free booklets contain information that you will find valuable in your data library.

Kewanee Private Utilities Co.
442 Franklin Street
Kewanee, Ill.

The marvelous color effects obtained with Ambler Asbestos Shingles increase the value of the house

In considering the great *durability* and the *fire-resisting* qualities of Ambler Asbestos Shingles do not overlook the commercial value of the *color* schemes they permit.

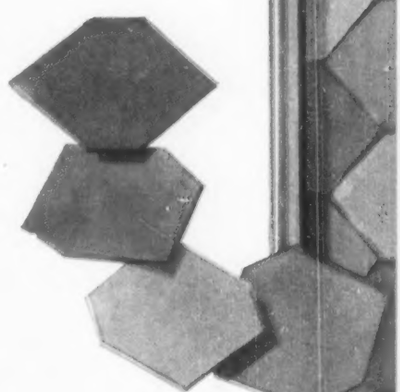
AMBLER ASBESTOS
BUILDING PRODUCTS

Ambler Asbestos Shingles are made in four non-fadeable tones, Newport grey, natural slate, red and green—the only green shingle that will not fade.

Many houses require color on the roof as a finishing touch. It is just that dash of color which gives the house character—which makes the favorable impression, which makes the house *command a better price.*

Ambler Asbestos Shingles are made from a scientifically accurate mixture of the best Portland cement obtainable and strong asbestos fiber. It is this combination of indestructible materials that gives to Ambler Asbestos Shingles their fire-resisting qualities and remarkable durability.

All architects and builders will be interested in seeing samples of the new shingle of everlasting green.

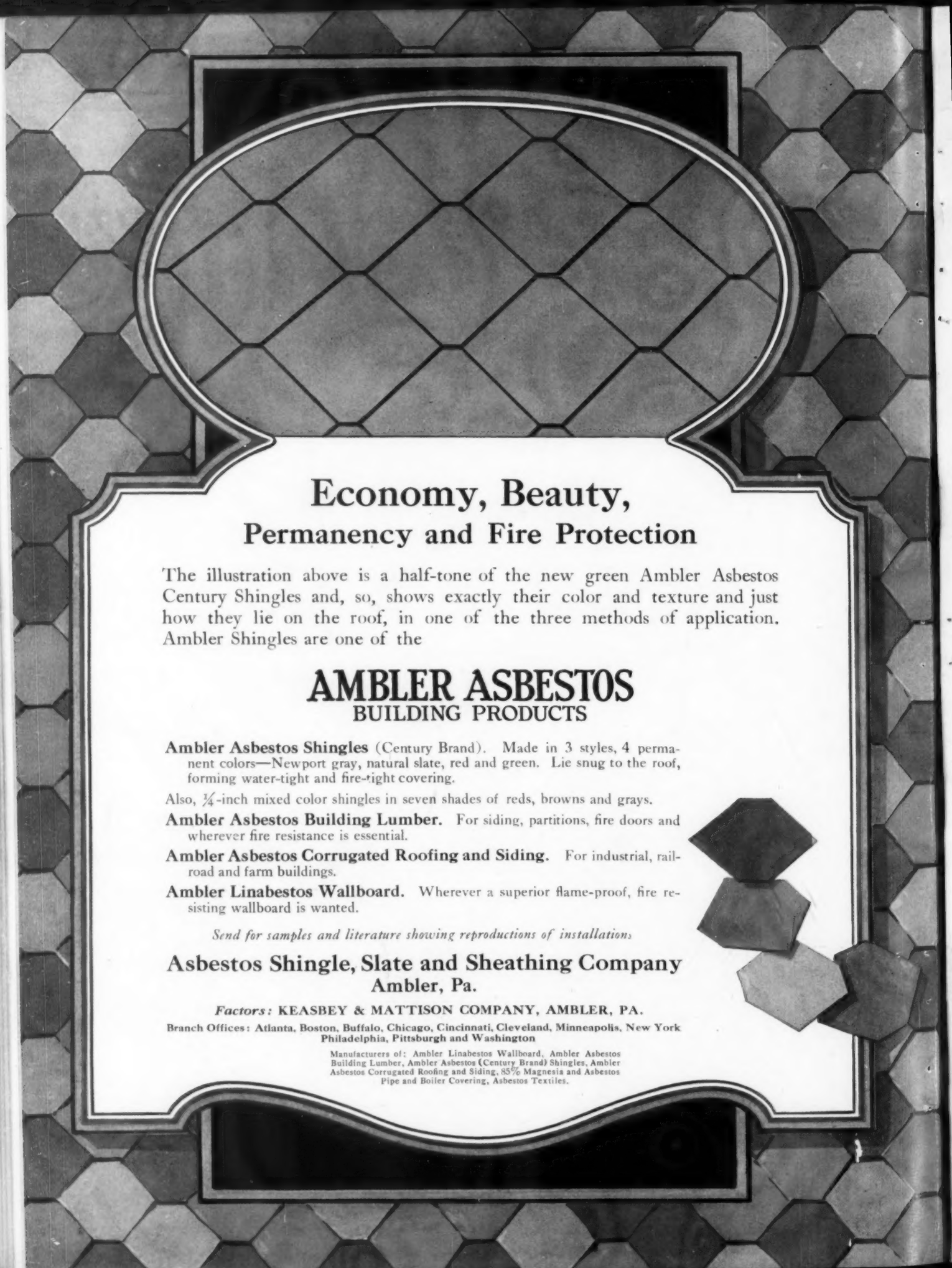


Send for samples showing color and construction

Asbestos Shingle, Slate and Sheathing Company
Ambler, Pa.

Factors: KEASBEY & MATTISON COMPANY, AMBLER, PA.
Branch Offices: Atlanta, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Minneapolis, New York, Philadelphia, Pittsburgh and Washington

Manufacturers of: Ambler Linabestos Wallboard, Ambler Asbestos Building Lumber, Ambler Asbestos (Century Brand) Shingles, Ambler Asbestos Corrugated Roofing and Siding, 85% Magnesia and Asbestos Pipe and Boiler Covering, Asbestos Textiles.



Economy, Beauty,
Permanency and Fire Protection

The illustration above is a half-tone of the new green Ambler Asbestos Century Shingles and, so, shows exactly their color and texture and just how they lie on the roof, in one of the three methods of application. Ambler Shingles are one of the

AMBLER ASBESTOS
BUILDING PRODUCTS

Ambler Asbestos Shingles (Century Brand). Made in 3 styles, 4 permanent colors—Newport gray, natural slate, red and green. Lie snug to the roof, forming water-tight and fire-tight covering.

Also, ¼-inch mixed color shingles in seven shades of reds, browns and grays.

Ambler Asbestos Building Lumber. For siding, partitions, fire doors and wherever fire resistance is essential.

Ambler Asbestos Corrugated Roofing and Siding. For industrial, railroad and farm buildings.

Ambler Linabestos Wallboard. Wherever a superior flame-proof, fire resisting wallboard is wanted.

Send for samples and literature showing reproductions of installations

Asbestos Shingle, Slate and Sheathing Company
Ambler, Pa.

Factors: **KEASBEY & MATTISON COMPANY, AMBLER, PA.**

Branch Offices: Atlanta, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Minneapolis, New York Philadelphia, Pittsburgh and Washington

Manufacturers of: Ambler Linabestos Wallboard, Ambler Asbestos Building Lumber, Ambler Asbestos (Century Brand) Shingles, Ambler Asbestos Corrugated Roofing and Siding, 85% Magnesia and Asbestos Pipe and Boiler Covering, Asbestos Textiles.

GRAVER
Water
Softening & Purification
HEADQUARTERS

Soft Water

THE GRAVER CORPORATION one of the oldest builders of water softening apparatus in the United States, announces the GRAVER ZEOLITE SOFTENER.

¶ This type of Graver Water Softener, although not put upon the market until this year, was first built by us in 1917.

¶ Since that time it has been in constant test use, carrying out the Graver policy of offering only proven products.

¶ Therefore, factory owners may install this Zeolite Softener with full confidence that it is in every way up to GRAVER Standard.

We have just published a descriptive Bulletin on the Graver Zeolite Softener. A copy of it will gladly be sent to anyone interested upon request.

GRAVER *Corporation*
(WM. GRAVER TANK WORKS FOUNDED 1857)

Steel Tanks and General Steel Plate Construction
Water Softening and Purifying Equipment

East Chicago, Indiana

6-A

PUT THIS UP TO YOUR NEXT CLIENT

Ask him if he would like to eliminate garbage cans and waste receptacles from his new building. That is exactly what the Kernerator does.

Into the hopper door in the kitchen the housewife throws all things that are not wanted — newspapers, tin cans, bottles, paper boxes, sweepings, garbage, broken crockery. These fall down the flue into the

Equipped with Kernerator
Jordan Apartment, Chicago
H. R. Wilson & Co., Architects

KERNERATOR
Built in the Chimney

in the basement. The dry waste when lighted dries the wet waste so it can burn. Non-combustible matter drops into the ash pit.
Installed when the building is erected. Requires little extra masonry.

Sanitary Economical Convenient Odorless

See Page 1132 Sweet's Catalog

KERNER INCINERATOR CO.
706 Clinton Street, Milwaukee, Wis.

Burns all household waste without a cent of operating cost.

Patented August 25, 1914, May 18, 1919.
Notice the draft reaching the point of burning through the by-pass (vertical) grate. The fire burns from the top downward, consuming offensive odors.

Partition Drawn Out

Traylor Apartment Hotel, Allentown, Pa.

Now is the time to contemplate alterations to be made during the summer months. These can be made most economically by using Wilson Folding Partitions.

Wilson Folding Partitions
(Sectionfold)
Are Necessary in Every Building

Partition Folded

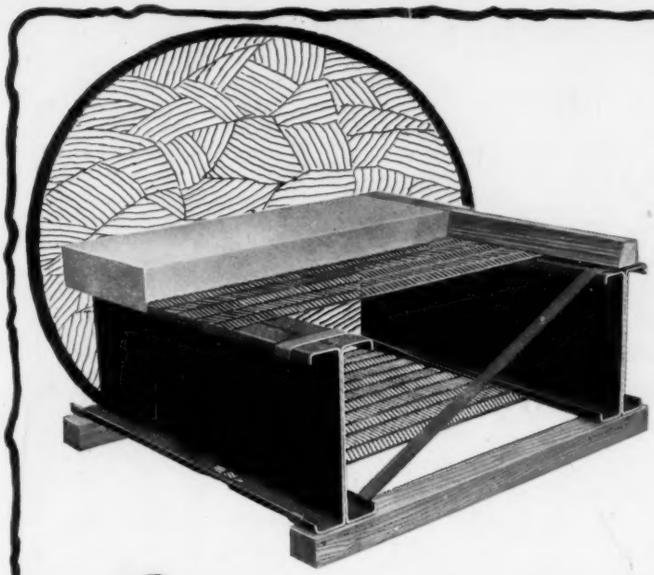
THE J. G. WILSON CORPORATION

8 W. 40th St., New York ESTABLISHED 1876 *Offices in Principal Cities*

Pacific Coast Office, 600 Metropolitan Bldg., LOS ANGELES, CALIF.

ALSO MANUFACTURERS OF

ROLLING STEEL DOORS ROLLING PARTITIONS SCHOOL WARDROBES DIFFUSELITE BLINDS, ETC.



"S/L"

-for convenience

When we specify GF Steel Lumber in our home office notes, we designate it by the little, cryptic symbol S/L. S/L is the convenient way of writing—

GF Steel Lumber

The actual product is more convenient for your use, when compared with other building materials of its scope.

It conserves lumber, time, money and patience. It is the *available*, "at hand" material for immediate use during the big rush in building activities of all types.

The strong features of GF Steel Lumber are listed below:—

Easy to erect.
Reduces dead load weight.
Fireproof.
Sound-proof.
Long-lived.
Adaptable to any type of construction.
Simply and practically designed.
Electrically spot-welded. No rivets.
Low in cost.
Uniform thickness.
Symmetrical—no internal stress.
Cold rolled from open hearth steel.
No splicing needed. Can be furnished up to 100 ft. lengths.
Stronger—because of better quality and uniform quantity of steel in each section.

(Our Steel Lumber Handbook should be of value to all architects and engineers. There is a copy for you, if you will write for it.)

The General Fireproofing Co.
YOUNGSTOWN, OHIO
BRANCHES

BUFFALO CHICAGO BOSTON MILWAUKEE KANSAS CITY
MINNEAPOLIS SAN FRANCISCO PHILADELPHIA OMAHA ATLANTA

Albert Kahn Architect — Thompson-Starrett Co., Contractors

Effective Waterproofing Lowers Maintenance Cost

By effective waterproofing, Architects and Builders avoid annoying patchwork on porous foundation walls.

Low cost of foundation and basement maintenance is assured. Costly replacements are made unnecessary by the specification and use of

TRUSCON *Waterproofing Paste* CONCENTRATED

The building of the Fisher Body Ohio Company, shown above, will prove no exception to the rule that waterproof concrete is permanent concrete when Truscon Waterproofing Paste is used.

It is a safety factor and a reducer of maintenance cost. It protects Architects, Engineers and Contractors and the operations they direct. Truscon Waterproofing Paste, Concentrated, is economical and safe—the most effective waterproofing known to science. It never fails.

A New Publication:
STRUCTURAL WATERPROOFING
Architectural and Engineering Edition
A complete handbook and reference guide upon Integral Waterproofings. 100 pages. 94 drawings, diagrams and plates. Size 8½ x 11". Free to Architects and Engineers *only*. Request must be written on business stationery. Price to public, 50c.

THE TRUSCON LABORATORIES

Worlds Largest Manufacturers of Integral Waterproofings

COR. CANIFF AVE. AND GRAND TRUNK R. R.

DETROIT MICHIGAN

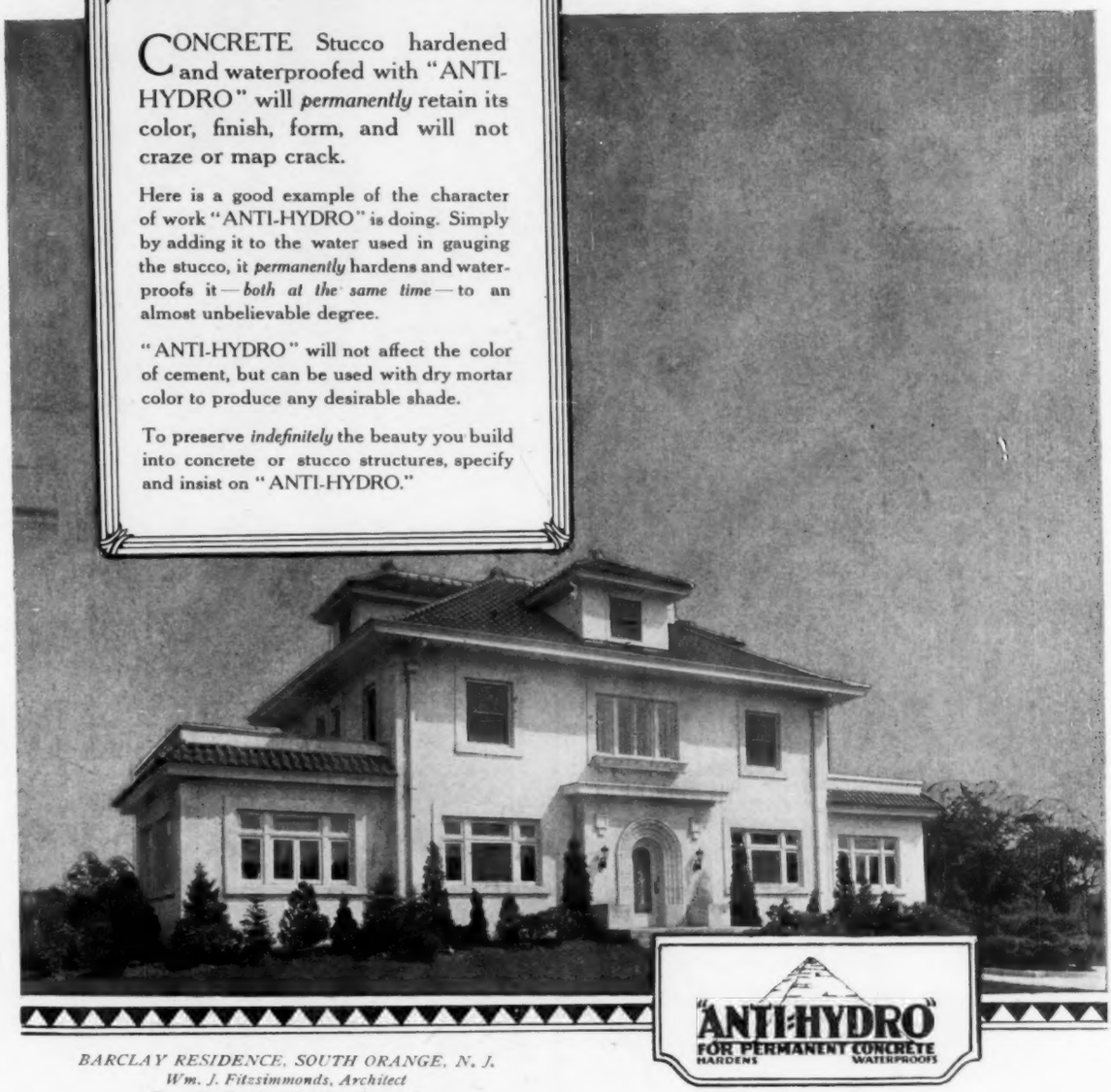
Laboratory — THE TRUSCON LABORATORIES — Quality

CONCRETE Stucco hardened and waterproofed with "ANTI-HYDRO" will *permanently* retain its color, finish, form, and will not craze or map crack.

Here is a good example of the character of work "ANTI-HYDRO" is doing. Simply by adding it to the water used in gauging the stucco, it *permanently* hardens and waterproofs it — *both at the same time* — to an almost unbelievable degree.

"ANTI-HYDRO" will not affect the color of cement, but can be used with dry mortar color to produce any desirable shade.

To preserve *indefinitely* the beauty you build into concrete or stucco structures, specify and insist on "ANTI-HYDRO."



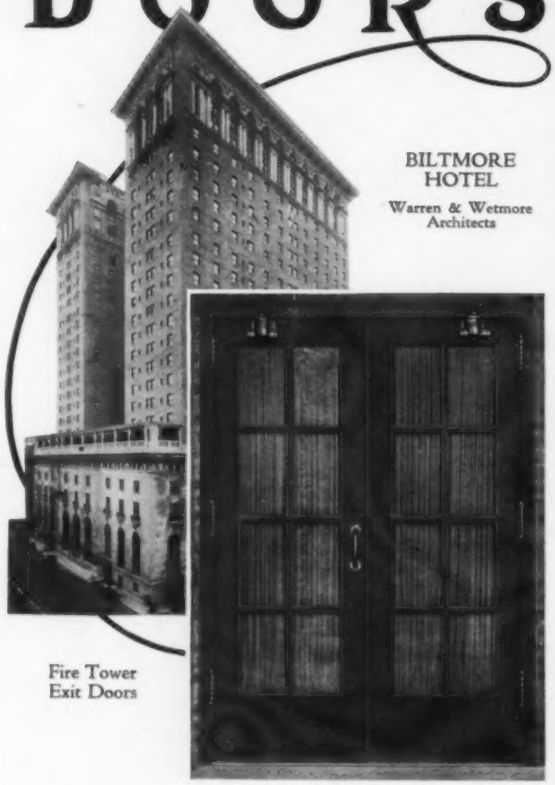
BARCLAY RESIDENCE, SOUTH ORANGE, N. J.
Wm. J. Fitzsimmonds, Architect
Connolly Construction Co., Contractors

"ANTI-HYDRO" is the oldest liquid integral waterproofer and hardener in existence. For more than fifteen years it has been used on every description of concrete work, and we can proudly point to the oldest installations as ample *proof* of the *permanence* of "ANTI-HYDRO" results. Specifications for various kinds of concrete work together with descriptive literature gladly sent on request.

"ANTI-HYDRO"

ANTI-HYDRO WATERPROOFING CO.
299 Broadway, New York

RELIANCE FIREPROOF DOORS



BILTMORE HOTEL
Warren & Wetmore Architects

Fire Tower Exit Doors

THE BILTMORE IS RELIANCE EQUIPPED

Other prominent hotels equipped with Reliance doors and windows:

Copley-Plaza	Boston, Mass.
Commodore	New York City
Pennsylvania	New York City
McAlpin (addition)	New York City
Ambassador	Atlantic City, N. J.
O'Henry	Greensboro, N. C.
Raleigh	Washington, D. C.
Broadmoor	Colorado Springs, Colo.
Condado	San Juan, Puerto Rico

Mail us your requirements for an estimate

Descriptive catalog sent on request

Reliance Fireproof Door Co.
Brooklyn, N. Y.

REPRESENTED IN ALL PRINCIPAL CITIES

ALIGNUM
Fireproof Doors
for
Hospitals
Industrial Buildings
Office Buildings
Hotels, etc.

"Alignum" is a mineral composition manufactured from fireproof mineral components, principally asbestos, amalgamated under hydraulic pressure, resulting in a very strong but resilient product. It does not contain any deleterious ingredients such as cinders, clay, plaster of Paris, magnesite or Portland cement.

"Alignum" is like wood in that it can be worked with ordinary carpenters' tools, and is finished in the same manner and with the same materials as wood. But, unlike wood, it will not decay, swell or shrink, warp, twist or check.

Send for descriptive bulletin and detail specification

ALIGNUM FIREPROOF PRODUCTS CO., Inc.
356 LEXINGTON AVENUE - NEW YORK

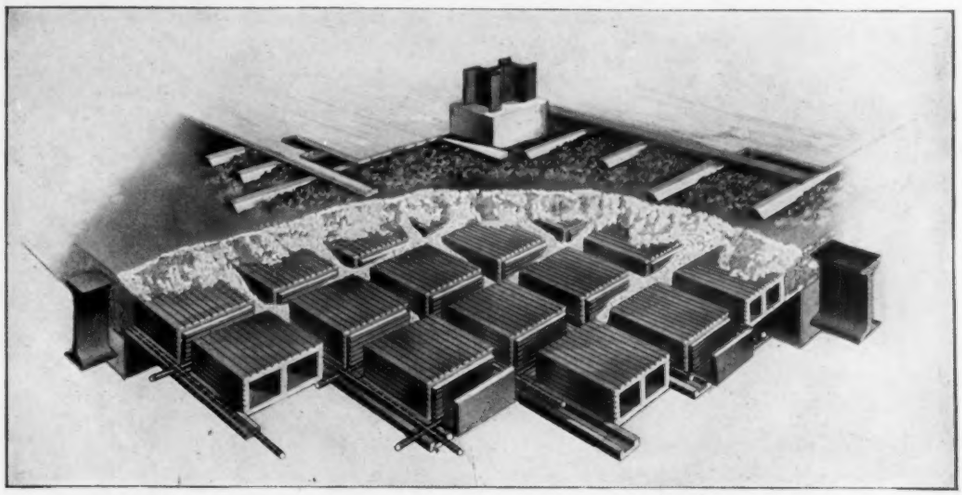
Boston Office
181 Congress Street

Philadelphia Office
Real Estate Trust Bldg.

Detroit Office
Builders & Traders Exchange

Chicago Office
Building Materials Exhibit

Main Office and Works: SOUTH RIVER, N. J.



The Right Way is the Only Way Republic Two-Way Fireproof Floor and Roof Construction can be Installed

THE centering is first erected from an easily interpreted plan which we provide. Republic Blocks are then placed in position according to schedule. At the same time, Republic Channels and Republic Soffits are laid in a manner which automatically spaces the blocks and closes all openings.

Each soffit, as shown in the diagram, is turned up at the sides to form a supporting ridge for the reinforcing rods, thus raising the rods off the bottom of the soffit and allowing the concrete to form completely around the rods.

These features are exclusive with Republic Construction and added to its other recognized structural and economy advantages have won for this system the endorsement of representative architects and engineers.

Shall we send you, without obligation, a book showing construction details and comparative framing plans?

REPUBLIC FIREPROOFING COMPANY, INC.

BOSTON
6 Beacon Street

NEW YORK
26 Cortlandt Street

CHICAGO
Monadnock Building

KEYSTONE
COPPER STEEL

SCIENCE has *added* to nature's product. For centuries the fight against rust and corrosion has been waged courageously, relentlessly—and now successfully. *Keystone Copper Steel* assures longer life to sheet metal.

About a decade ago, after years of careful research and practical demonstration, this Company announced the discovery of an efficient method of alloying *steel* with *copper* for increasing rust-resistance. *Keystone* quality is a notable scientific achievement—and has given to the world a new standard for wear.

American Sheet and Tin Plate Company

General Offices: Frick Building, Pittsburgh, Pa.

DISTRICT SALES OFFICES:

Chicago Cincinnati Denver Detroit New Orleans New York Philadelphia Pittsburgh St. Louis

Export Representatives: United States Steel Products Company, New York City

Pacific Coast Representatives: United States Steel Products Company, San Francisco, Los Angeles, Portland, Seattle

KEYSTONE COPPER STEEL

YEARS of service have now proved under most exacting conditions that *Keystone Copper Steel* does *resist rust* to the maximum degree. The long service that it gives in the many forms in which it is used, is attested by every steel using industry.

Look for the Keystone. Send for interesting booklet.

This special mark gives protective identification to every sheet of genuine Copper Steel. Look for it. We will gladly send literature describing this remarkable product.

Keystone Copper Steel is supplied in Black and Galvanized Sheets, Corrugated Sheets, Formed Roofing and Siding Products, Tin and Terne Plates, Etc. Particular architects should be careful to specify *Keystone* quality.

American Sheet and Tin Plate Company

General Offices: Frick Building, Pittsburgh, Pa.

MANUFACTURERS OF

Sheet and Tin Mill Products of every description, including Black Sheets, Galvanized Sheets, Tin and Terne Plates, Electrical Sheets, Corrugated and Formed Roofing and Siding Materials. Special Sheets for Stamping. Wellsville Polished Steel Sheets, Automobile Body Sheets, Deep Drawing Sheets, Stove and Range Sheets, Black Plate, Etc.

Architectural and Structural Shapes

Made from BRASS and SPECIAL BRONZE ALLOYS by either the Extrusion or the Rolling and Drawing Process.

Mouldings, Angles, Channels, Tees and special shapes suitable for fabricating fireproof doors, window sash and frames, store fronts, bank screens, grilles, handrails, stair nosings, sanitary base mouldings and other art metal construction.

Brass and Copper Tubes

Iron Pipe sizes for Plumbing Installations.

Benedict Nickel Sheet, Tube and Ingot

For exposed plumbing, ornamental work and hardware where strong, durable material with a permanent white color is required.

Descriptive pamphlets and prices furnished upon application.

The American Brass Company

Main Office:

Waterbury, Conn., U. S. A.

Ansonia Branch
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Waterbury, Conn.

Buffalo Branch
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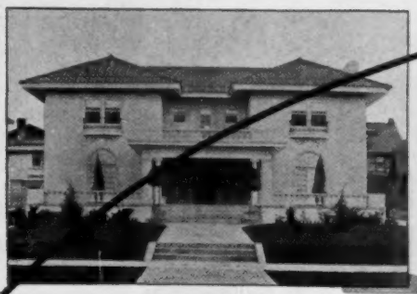
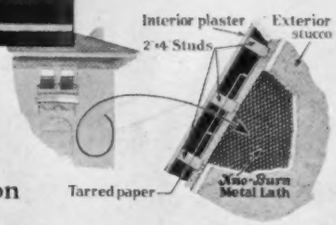
Coe Brass Branch
Torrington, Conn.

Kenosha Branch
Kenosha, Wis.

Waterbury Brass Branch
Waterbury, Conn.



If you are planning to build a home it is to your advantage to consult an architect. He understands all forms of construction, and how best to provide the home you desire. He will save you money, relieve you of details, and assure you of a thoroughly satisfactory home.



Beautiful in Design Substantial in Construction

ALL of your desires for the artistic in home building can be fulfilled in stucco construction. Adaptable and distinctive, it lends itself to graceful contour and attractive finish.

And since you build not only for today, but for ten, twenty, thirty or more years from now, durability is as important, if not more so, than beauty. Build, therefore, of a substantial construction—specify metal lath for the base for your stucco.

Kno-Burn
Metal Lath

as a base for stucco is also a reinforcement—fire-resisting and lasting. The small diamond shape meshes grip the stucco firmly and hold it securely.

Metal lath as a base for stucco and plaster represents the most economical form of fire-resisting construction.

The Builders Book, a great help to the home builder, will be gladly sent you upon request.

The North Western Expanded Metal Co.
955 Old Colony Building, Chicago, Illinois

New York Los Angeles Boston

This advertisement will appear in the July issues of "House and Garden" and "House Beautiful"

Consult an Architect

Co-operation with architects is an established principle of The North Western Expanded Metal Company.

THE NORTH WESTERN EXPANDED METAL CO.
934 OLD COLONY BUILDING
CHICAGO, ILLINOIS

New York Los Angeles Boston

NorthWestern Expanded Metal Company

Silencing Casement Windows

ART has won your appreciation of outswung casement windows. But how often in the night has their banging disturbed your repose? How do you control them when the winds of an approaching storm start them slamming?

With the Monarch Control-Locks, these windows are held absolutely firm in any position—tightly closed, wide open or at any angle in between. Each sash is operated by an ornamental little handle on the inside. Raise it, and the sash swings; turn it down, and the sash is locked. Screens, curtains, pot flowers—none of them are disturbed in the least.

There is nothing about the hardware to get out of order. A distinct charm pervades the whole house with casement windows silenced.

Specifications covering the proper use of the Monarch Control-Lock appear on page 179 of the American Architect Specifications Manual.

MONARCH METAL PRODUCTS

Monarch Metal Products Co.
5000 Penrose Street
St. Louis, U. S. A.

Manufacturers also of Monarch Metal Weather Strip

MONARCH
CASEMENT WINDOW HARDWARE

MINERAL WOOL

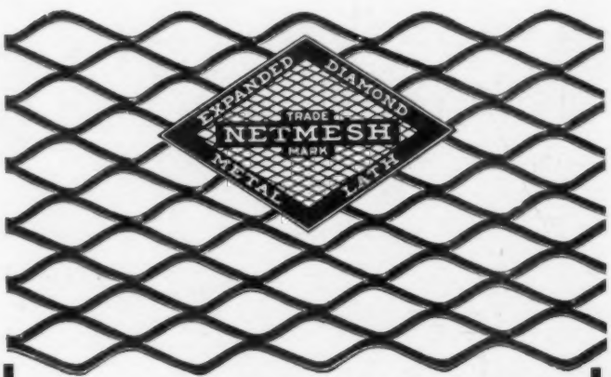
for

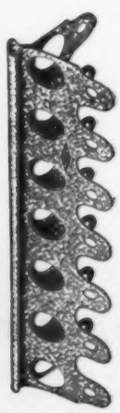
FIREPROOFING
DEADENING OF SOUND AND
INSULATION OF HEAT
AND COLD IN

RESIDENCES
COLD STORAGE, ETC.

Moderate in Cost
Easily Applied

United States Mineral Wool Co.
280 MADISON AVENUE NEW YORK CITY





BETTER ACOUSTICS SECURED

For Schools, Churches, Theatres, Auditoriums, etc., by the use of metal lath. See article on another page of this issue, based on Professor Watson's test. The acoustic properties of "Netmesh" Metal Lath are as important in the buildings above mentioned as its fire-retarding, rat-excluding qualities. Write for circulars.

CORNER BEADS

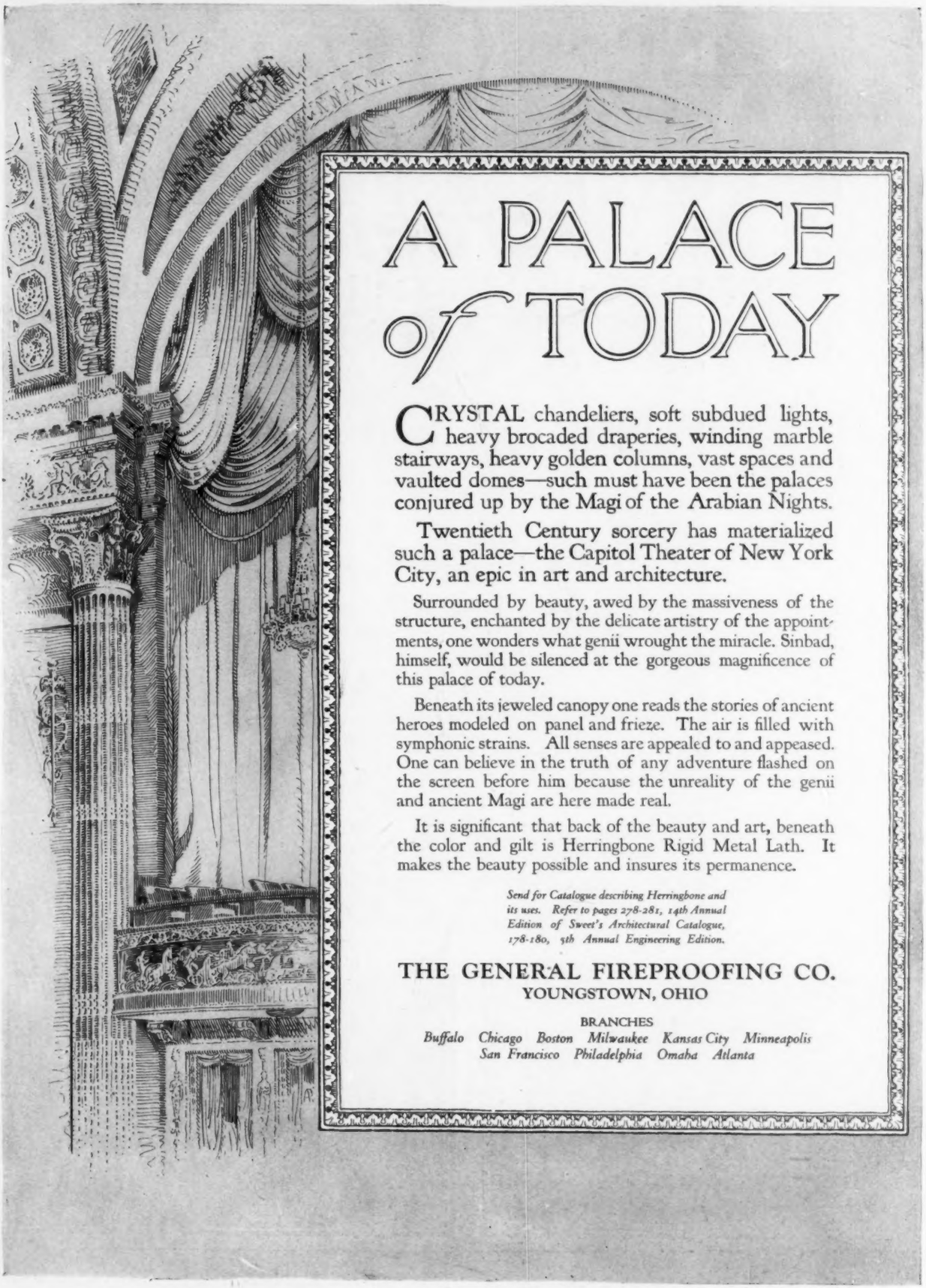
"Superior" Inside and Outside Corner Beads preserve the original newness of the corners, preventing breaks and radial cracks.

Write for circulars giving details of these modern building necessities.

MILWAUKEE CORRUGATING CO.
MILWAUKEE, WIS.
Branch at Kansas City, Mo.
Minneapolis Sales Office, Lumber Exchange

"SUPERIOR" Outside Bead

"SUPERIOR" Inside Bead Patented Oct. 21, 1913



A PALACE of TODAY

CRYSTAL chandeliers, soft subdued lights, heavy brocaded draperies, winding marble stairways, heavy golden columns, vast spaces and vaulted domes—such must have been the palaces conjured up by the Magi of the Arabian Nights.

Twentieth Century sorcery has materialized such a palace—the Capitol Theater of New York City, an epic in art and architecture.

Surrounded by beauty, awed by the massiveness of the structure, enchanted by the delicate artistry of the appointments, one wonders what genii wrought the miracle. Sinbad, himself, would be silenced at the gorgeous magnificence of this palace of today.

Beneath its jeweled canopy one reads the stories of ancient heroes modeled on panel and frieze. The air is filled with symphonic strains. All senses are appealed to and appeased. One can believe in the truth of any adventure flashed on the screen before him because the unreality of the genii and ancient Magi are here made real.

It is significant that back of the beauty and art, beneath the color and gilt is Herringbone Rigid Metal Lath. It makes the beauty possible and insures its permanence.

Send for Catalogue describing Herringbone and its uses. Refer to pages 278-281, 14th Annual Edition of Sweet's Architectural Catalogue, 178-180, 5th Annual Engineering Edition.

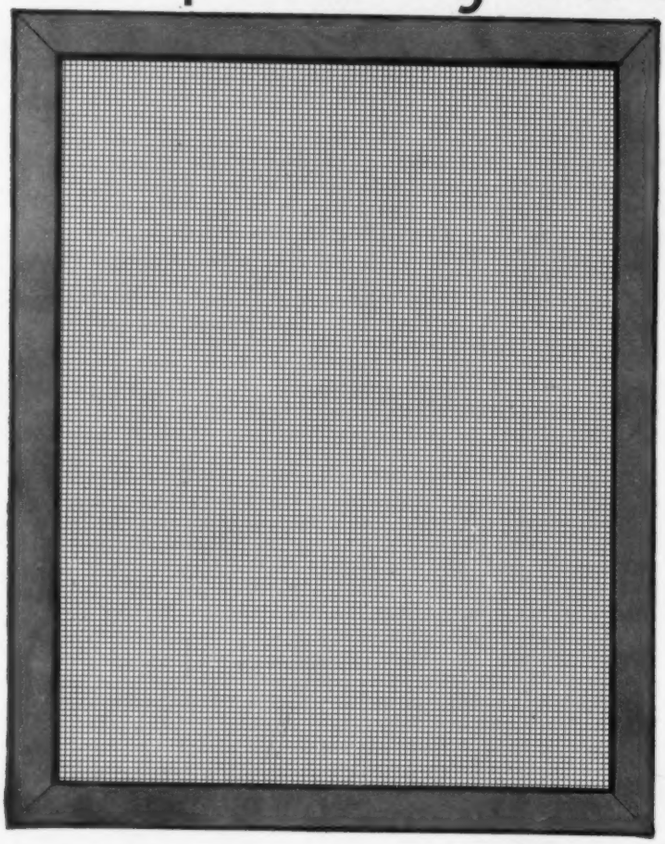
THE GENERAL FIREPROOFING CO.
YOUNGSTOWN, OHIO

BRANCHES
Buffalo Chicago Boston Milwaukee Kansas City Minneapolis San Francisco Philadelphia Omaha Atlanta

INCo

MOnel metal screen

never rusts–practically everlasting



THE INTERNATIONAL NICKEL COMPANY

Why should an architect specify the screening?

PLAIN self protection. For if a building's fixtures or accessories deteriorate rapidly he's to blame. No matter who made the choice—"the architect should have known better."

Damp salt air, smoke and chemical fumes that rapidly corrode coated steel or copper or bronze—the usual screening materials—have no perceptible affect on Monel. Monel wire screen is standing up untouched along our own seashore and in tropical seacoast service on government buildings at Panama.

That Monel wire proves strongest, less brittle after years of use is indicated by this metal's wide employment for wire filter cloth for acids and in other exacting industrial service—wherever a metal must stand up against acids, alkalies, great heat or steam wear. Other more common forms and uses of Monel are roofing, flashing, ornamental trim, hinges, screws, bolts, shingle and sheathing nails, marine fittings, chain, kitchen and laundry equipment, golf club heads, etc.

The name MONEL is given to a line of metal products fabricated from a natural nickel alloy — 67% nickel, 28% copper, and 5% other metals. These products include MONEL blocks, MONEL rods, MONEL castings, MONEL wire, MONEL strip stock, MONEL sheets, etc. MONEL is a product of The International Nickel Company, producers of Inco Nickel—the standard nickel for alloy steels.

MONEL Screen is made in the usual widths, meshes and gauges. Write us for names of manufacturers where MONEL Metal Screen may be obtained.

THE INTERNATIONAL NICKEL COMPANY
43 Exchange Place, New York, N. Y.
The International Nickel Company of Canada, Ltd., Toronto, Ont.

RESIDENCES

INCO MONEL METAL TRADE MARK

INCO NICKEL MARK

THE INTERNATIONAL NICKEL COMPANY

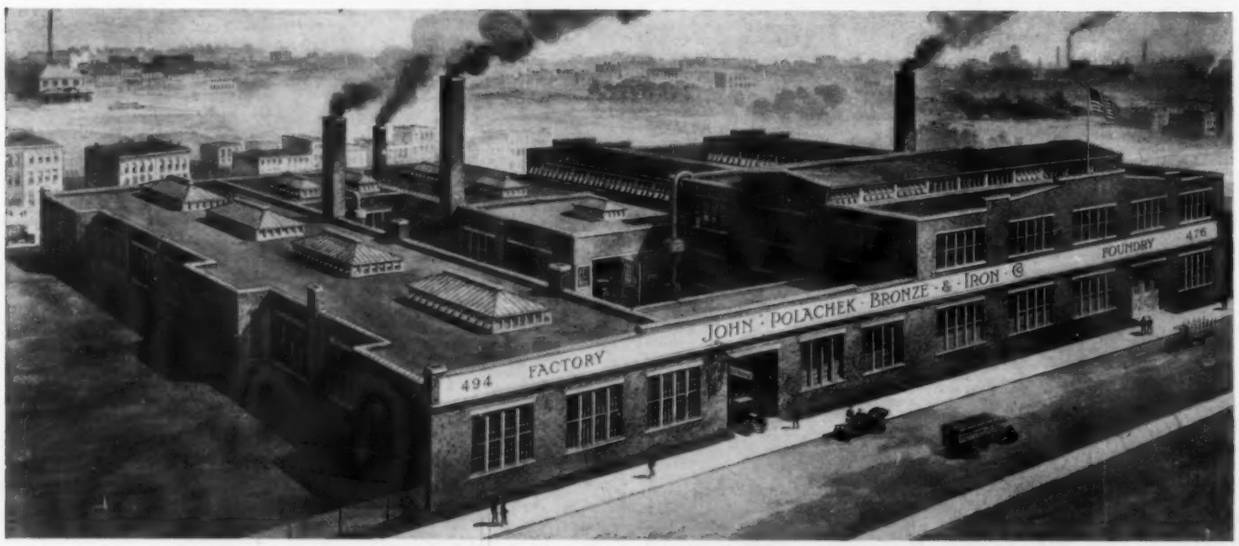
HECLA IRON WORKS

IN CONTINUOUS OPERATION FOR 43 YEARS

ARCHITECTURAL IRON AND BRONZE WORK

OFFICE: 118 NORTH 11TH STREET

WORKS: NORTH 10TH TO NORTH 12TH STREETS BROOKLYN, N. Y.



Our Plant Covers 1½ Acres of Ground and is Completely Equipped with Every Modern Machine and Appliance Required for the Production of Distinctive Metal Work

JOHN·POLACHEK·BRONZE·&·IRON·©.

DISTINCTIVE METAL WORK

476-494 HANCOCK ST. & 575-591 BOULEVARD

LONG ISLAND CITY, N.Y.

DISTINCTIVE METAL WORK ◆ DISTINCTIVE METAL WORK

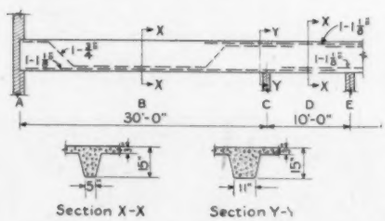
TRADE MARK

In the design of concrete structures, the engineering staff of The Hydraulic Steelcraft Company renders in co-operation with architects and engineers a complete engineering service on a fee basis.

UNEQUAL SPANS

(CONTINUED)

IN the May issue of this journal we illustrated the design which is often used for a slab spanning three unequal spans. Below is shown the correct design for the same case.



It will be recalled that we previously determined that the bending moment at D, i. e. $M_D = -10{,}986$ ft. lbs. per ft. width $= -274{,}000$ in. lbs. per joist. Since this moment is negative we have tension in the top of the slab. To resist the compression stress we have only the joist width of 5 inches at the under side of the joist.

This width of joist requires the use of one 1-1/8-inch square bar for compressive reinforcement and one 1-1/8-inch square bar in the top for tension reinforcement.

It will be noted that a width of joist of 11 inches is provided at C. To the left of this support a width of 9-1/2 inches would be needed to provide for diagonal tension or shear where no stirrups are used and with a width of 11 inches only a small amount of compressive steel is required at this point for negative compression. The reinforcement for tension at this point consists of one 1-1/8-inch square bar and one 3/4-inch square bar.

A comparison between this design and that shown in the April issue will emphasize the great difference between the two designs

THE HYDRAULIC STEELCRAFT COMPANY
of THE HYDRAULIC STEEL COMPANY

New York CLEVELAND Chicago
Detroit

This is the Fourth of a Monthly Series dealing with "Structural Designing"

A G & G Telescopic Hoist Will Reduce Operating Costs of Large Buildings!

Model E — Electric

For large quantities of ashes. That part of Hoist shown *telescopes* below grade, when Hoist is not in operation.

ARCHITECTS throughout the country are specifying G & G Telescopic Hoists to take care of the ash and rubbish removal from large office buildings, institutions, etc. These Hoists are doing their share in reducing the cost of operating the buildings they serve as — with the Hoist — *one* or *two* men can do the work of ash removal far *better* and *quicker* than five men under the old time-and-money-wasting methods.

G & G Hoists are made in a variety of models — *electrical* and *manual*. Only a small space required. Fits to best advantage in an area 4 feet square. Can be installed in old as well as new buildings. No need to excavate. Heel of Hoist rests on basement floor. As Hoist is designed to raise loads of 500 lbs., it can be used in many other ways at building.

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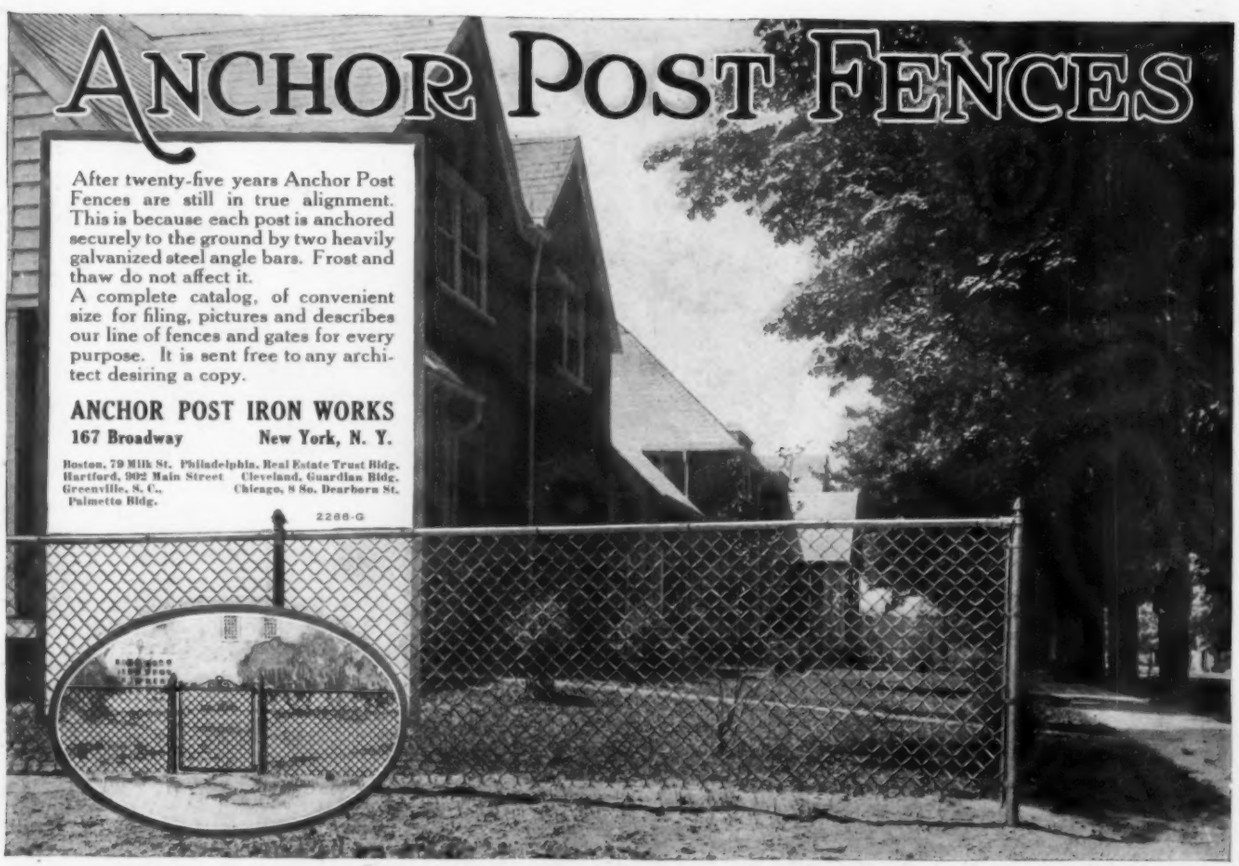
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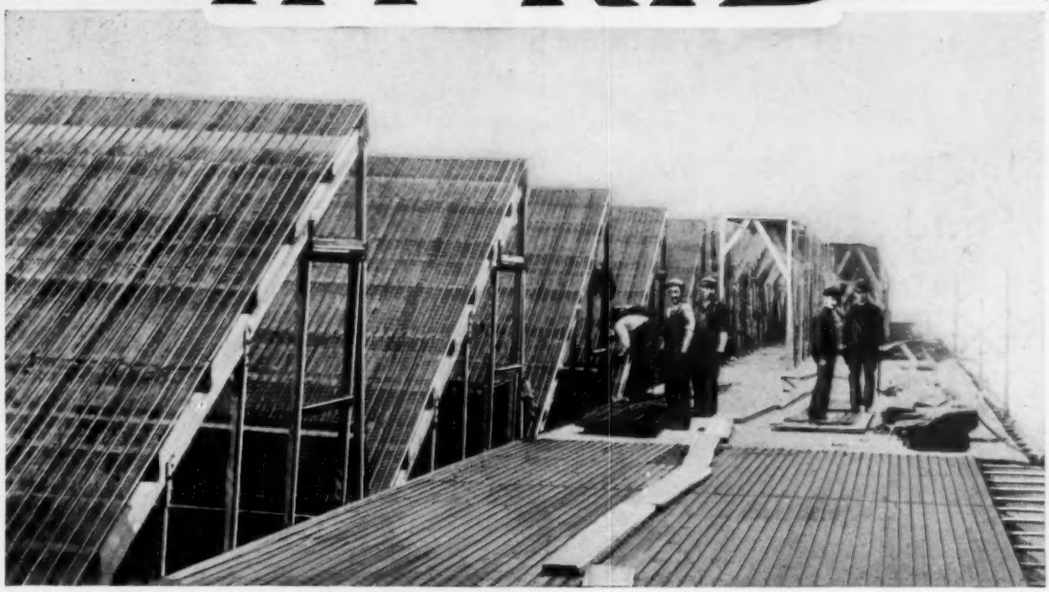

Hy-Rib Saw-tooth Roofs before Concreting, Oliver Chilled Plow Co. Prack & Perrine, Architects

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The most practical roof for present day needs is the Hy-Rib concrete roof. Fireproof, permanent and light in weight this roof is rapidly and economically erected without the use of forms and with minimum labor.

Hy-Rib is a steel mesh stiffened by rigid ribs all manufactured from a single plate. The Hy-Rib sheets are set in place, the concrete applied and the under surface plastered. The construction is very simple and rapid—no forms nor special equipment are required.

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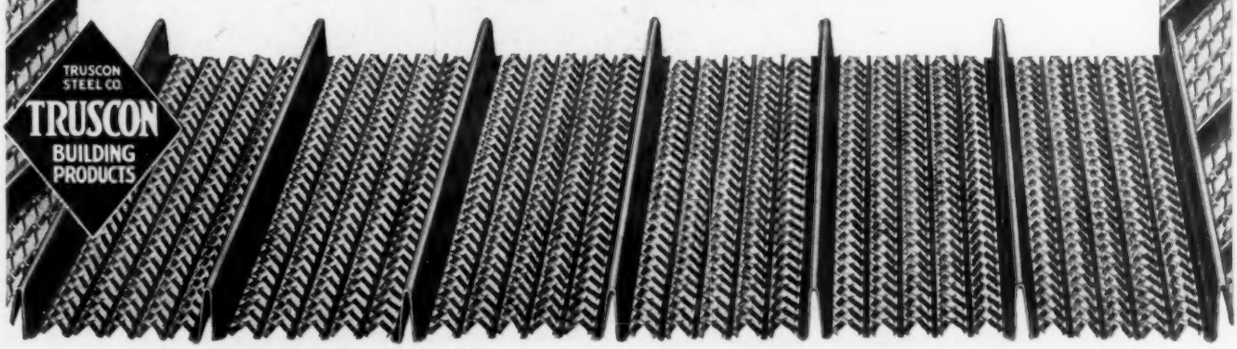

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TRENTON, NEW JERSEY
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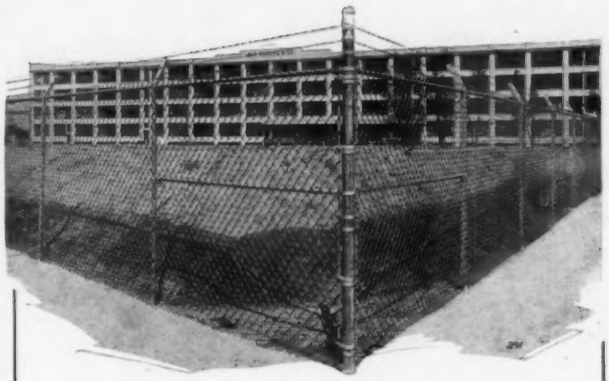

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for Quality Electrical Work

CRANE
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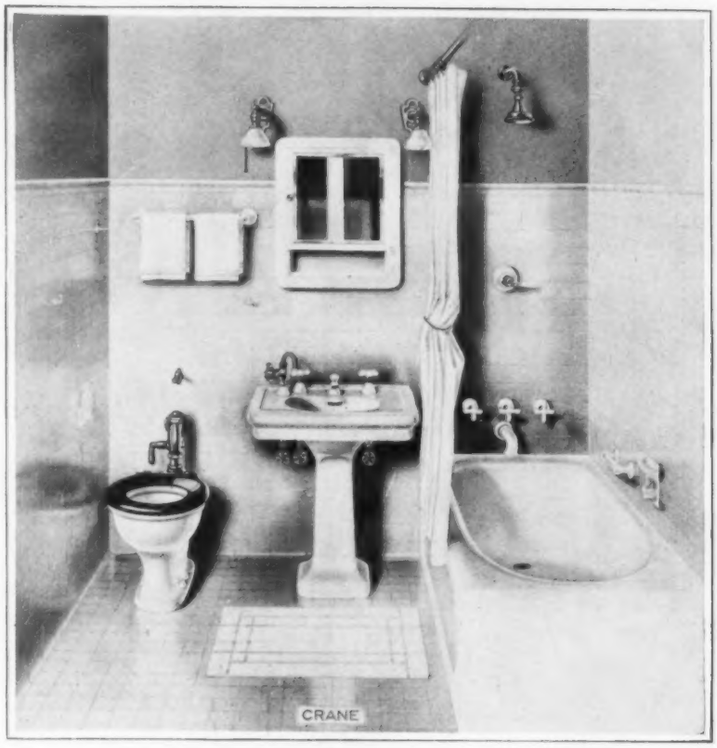

The fixtures illustrated above include our "Purus" closet fitted with Crane air controlled flushing valve and "Whalebonite" seat; 5′ 6″ recess "Modus" bath with over-rim spout; Crane mixing valve shower; integral spout "Nova" lavatory with "Triumph" gooseneck ice-water faucet. This entire bath room can be installed in a space 5½ x 7 feet.

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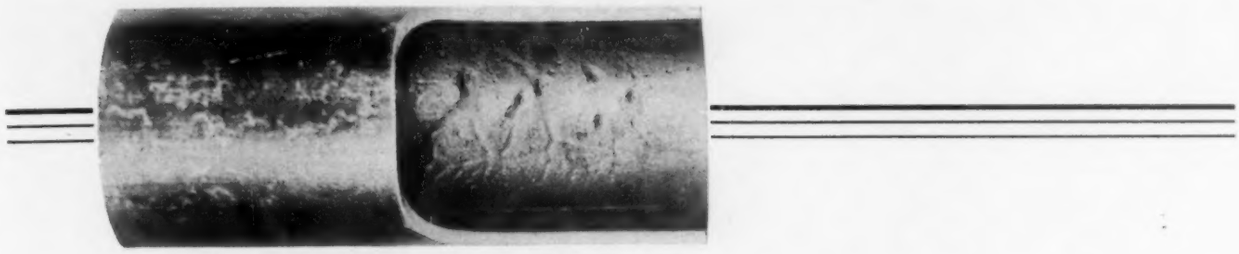
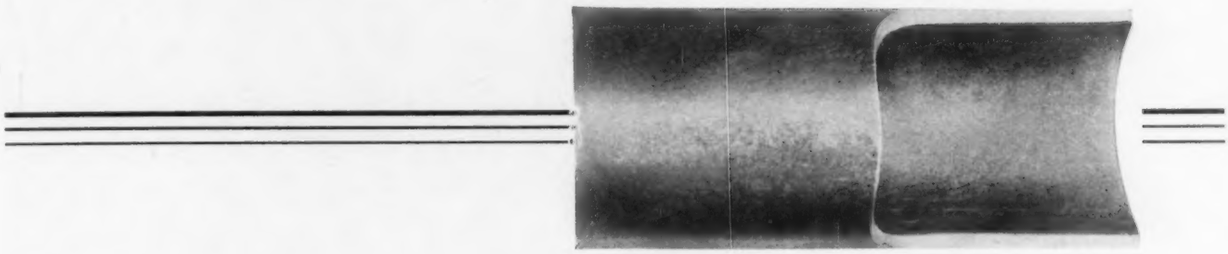


Ordinary black butt-weld pipe, showing characteristic coating of welding-scale



"NATIONAL" Welding-SCALE FREE Pipe, showing clean, smooth surfaces of this modern product

Has It Ever Occurred To You

that such clean, smooth surfaces could be obtained on butt-weld pipe? These pictures should quickly convince you that this has been actually accomplished.

The advantages of pipe free from welding-scale and the process of manufacture are explained and illustrated in "NATIONAL" Bulletin No. 7—Manufacture and Advantages of "NATIONAL" Welding-SCALE FREE Pipe. Ask any of the offices below for your copy.

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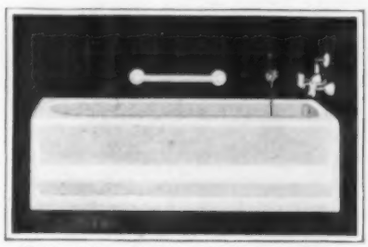
KOHLER

And HOTEL FORT SHELBY



Kohler "Viceroy" Built-in Bath, *Recess Pattern*

Dynamic Detroit's newest hostelry—the Hotel Fort Shelby—was planned with one idea in mind: the comfort and convenience of the guest. It was a foregone conclusion, then, that the 508 plumbing fixtures would be of Kohler Enameled Ware. For these snow-white, glistening products of utility, beauty and durability are found in leading hotels throughout the land. This public favor extends, as well, into homes, apartments, clubs and institutions, where the easily cleaned Kohler enamel renders the products which it armors, invitingly spotless and prolongs their usefulness through the years.

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If your file lacks that convenient handbook, "KOHLER of KOHLER," illustrating and describing in detail the Kohler Enameled Plumbing Ware Products, write

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Kohler Co., *Founded 1873*, Kohler, Wis.
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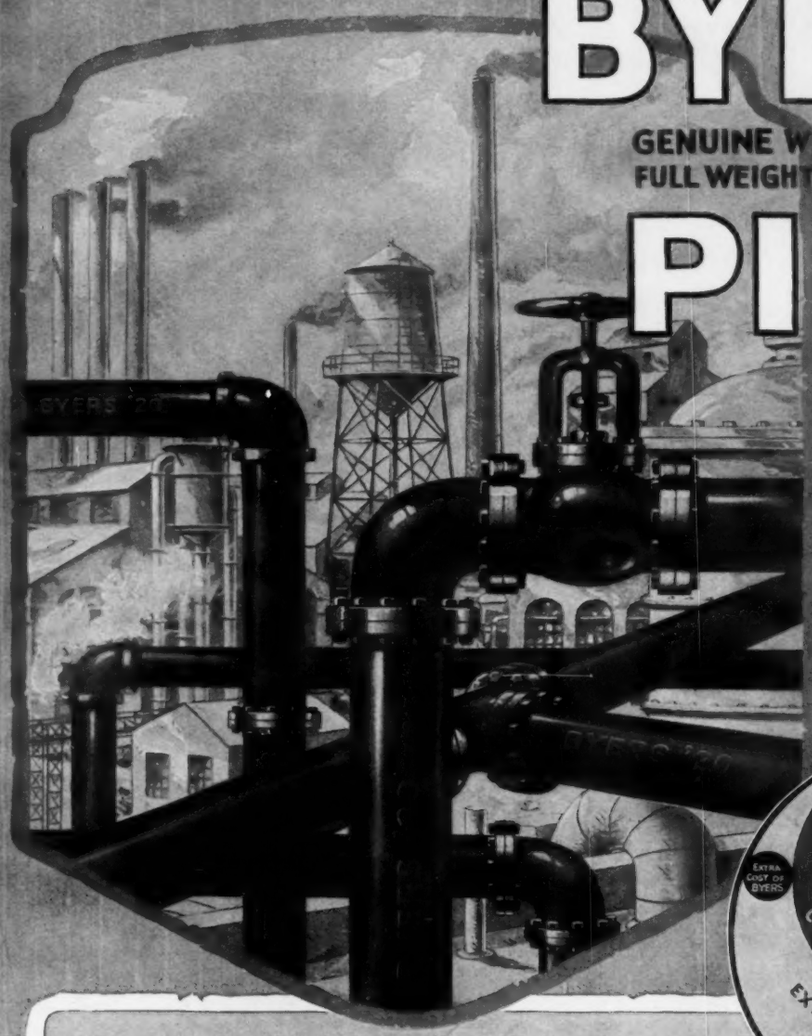
BYERS

GENUINE WROUGHT IRON
FULL WEIGHT GUARANTEED

PIPE



Look for the Name and Year Rolled in every Length

Five Per Cent Higher Cost —100% Longer Life

that in a nutshell is the Why of Byers Pipe

Surely the extra first cost of Byers pipe is much more than five per cent, you say. Right. But the extra cost of Byers pipe *installed,* rarely exceeds five per cent of the cost of the system. That is the important thing to look at.

Analyze the items of cost in any power, heating, plumbing or hydraulic system, and you will find, perhaps to your surprise, that fittings, valves, flanges, bends, covering, shop work, labor, supervision, and overhead make up from 80 to 90% of the cost of the installation, yet you realize that when the pipe fails, the whole investment is a total loss.

Byers Bulletin No. 38 (illustrated), entitled "The Installation Cost of Pipe," contains cost analyses of a large variety of power and industrial pipe systems, with notes on corrosive conditions, renewal expense and salvage. Send for a copy today

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PROPER working conditions reduce labor turnover and accelerate production.

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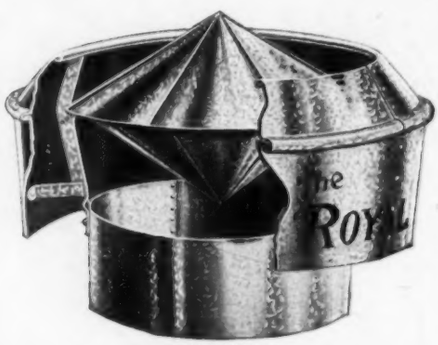

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ROYAL *Double Cone* Ventilators

Have the right principle: they pull foul air out and force fresh air in. The distinctive advantages of the "ROYAL" are the Tapered Outer Wind Deflectors, the Inverted Cone and the Radiating Ribs, insuring a constant upward movement of air. Study this design: there is no obstruction to impede the outward flow of air. Maximum exhaust is obtained. Downward currents of air are impossible. The high efficiency of "ROYAL" Ventilators has been proven in every installation.

Made Round or Rectangular. Metal or Glass Top

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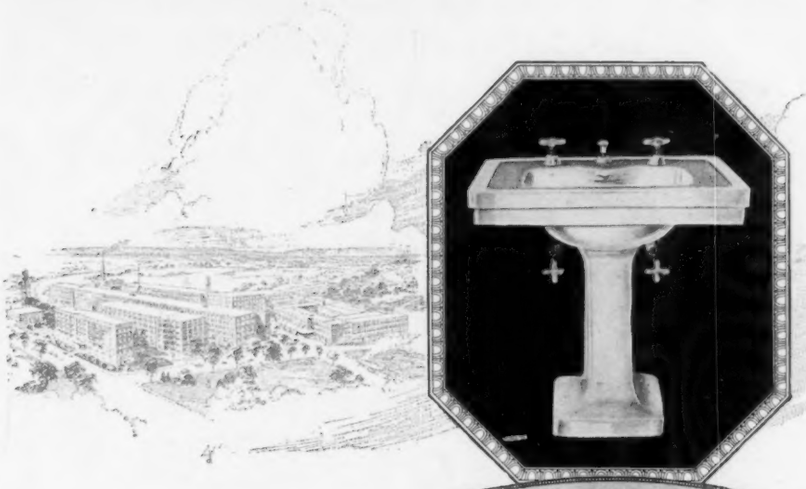

In the factory of the Fisk Rubber Co., Chicopee Falls, Mass.
Architect: Geo. B. Allen, Company's Architectural Engineer
Plumbing Contractor: John W. Barrett, Springfield, Mass.
Plumbing Jobbers: Plimpton & Hills Corp., Hartford, Conn.

MADDOCK

The health protection features of Maddock sanitary equipment

Better sanitation, better health protection and better working conditions were all secured in the factory of the Fisk Rubber Company, Chicopee Falls, Mass. by the installation of Maddock sanitary equipment.

Maddock lavatories are provided with a patented cleansing feature which makes it easy to keep the overflow clean and sanitary. Maddock closets have extra large water surface and a thin flushing rim which provide the utmost in sanitation and non-soiling advantages.

And, being made entirely of snow-white, almost unbreakable vitreous china which will never chip, crack or craze, these fixtures give a maximum in health protection throughout a lifetime of use.

Architects who do not have the Maddock architect's catalog on file should write for it. This book describes the Maddock line of fixtures for domestic use, for hospitals and medical purposes, for public building requirements, etc.

See our section in the Fourteenth Annual Edition of Sweet's Catalog, pages 1037 to 1044.

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Manufacturers of sanitary earthenware plumbing fixtures for bath, kitchen and laundry needs in the home; also sanitary ware for medical, industrial, commercial and public building installations

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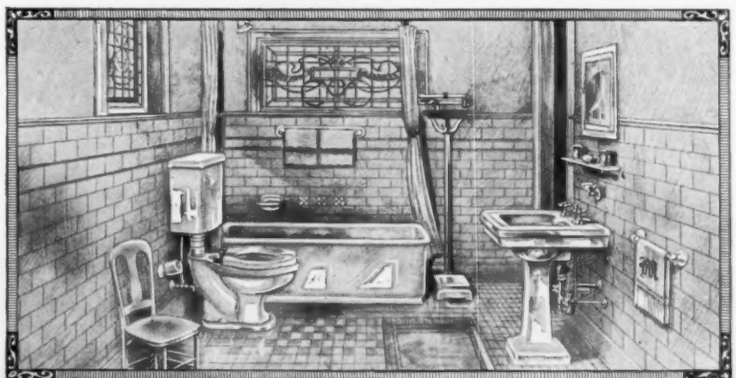

THOS. MADDOCK'S SONS CO. TRENTON N.J.

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The valve handles and other slab fittings are also made of vitreous china, which eliminates the care required to keep ordinary metal parts clean.

This lavatory may also be furnished with center leg support, instead of pedestal, when so desired.

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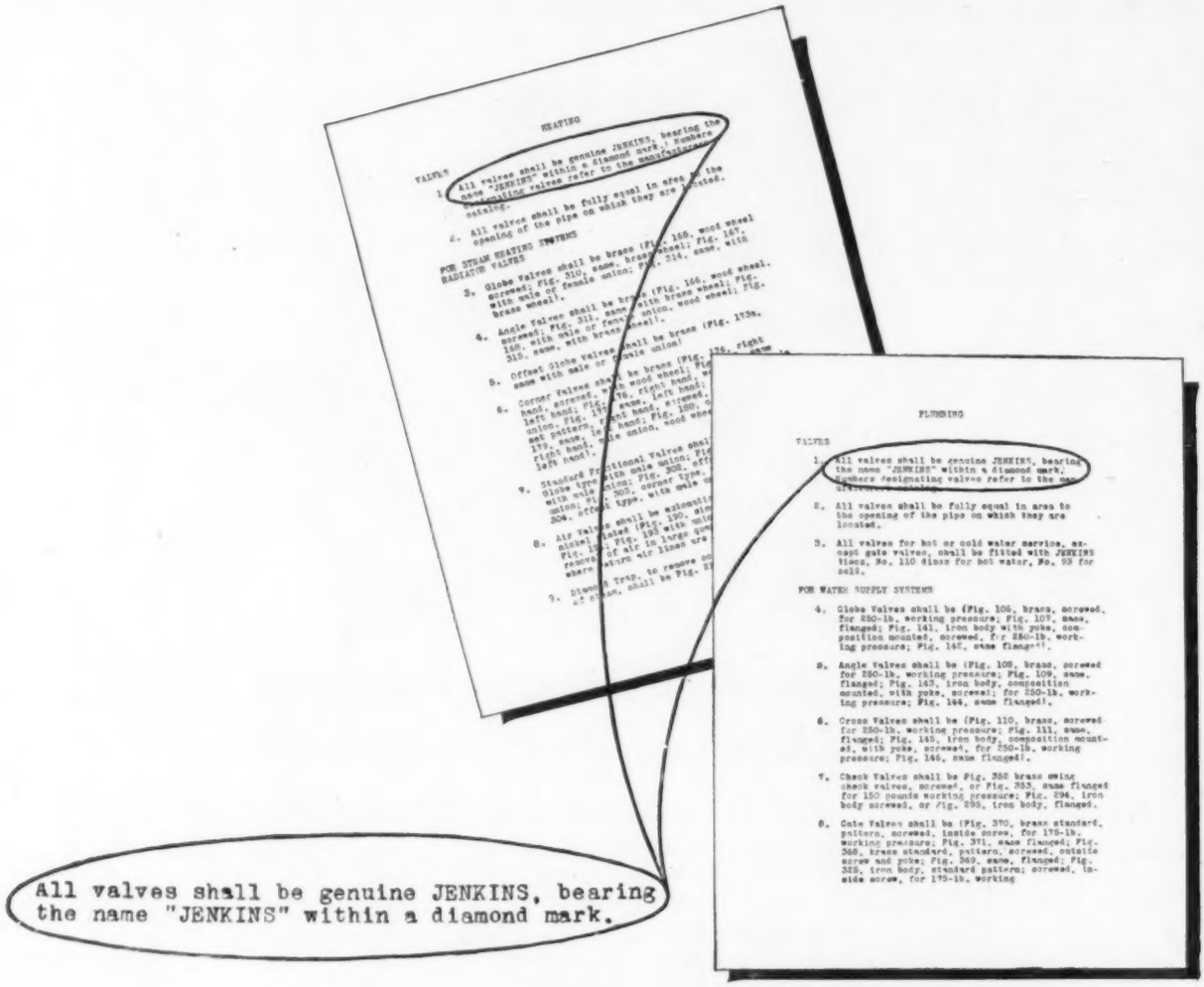
HEATING
VALVES
1. All valves shall be genuine JENKINS, bearing the name "JENKINS" within a diamond mark. Numbers designating valves refer to the numbers in Jenkins catalog.
2. All valves shall be fully equal in area to the opening of the pipe on which they are located.
FOR STEAM HEATING SYSTEMS
RADIATOR VALVES
3. Globe Valves shall be brass (Fig. 106, wood wheel screwed; Fig. 310, same, brass wheel; Fig. 167, with male or female union; Fig. 314, same, with brass wheel.
4. Angle Valves shall be brass (Fig. 108, wood wheel, screwed; Fig. 311, same, with brass wheel; Fig. 168, with male or female union; wood wheel; Fig. 315, same, with brass wheel.
5. Offset Globe Valves shall be brass (Fig. 173a, same with male or female union)
6. Corner Valves shall be brass (Fig. 175, right hand, screwed, with wood wheel; Fig. 176, right hand, left hand; Fig. 177, same, left hand; with male or female union, Fig. 178, right hand; Fig. 179, same, left hand; screwed, pet pattern, right hand; Fig. 180, same, left hand, male or female union, wood wheel; Fig. 179, same, right hand, Fig. 180, same, left hand.
7. Standard Pressure Reducing Valves shall be (Fig. 305, globe type, with male or female union; Fig. 306, with male union; Fig. 307, angle type, with male union; Fig. 308, corner type, with male union; Fig. 309, offset type, with male union)
8. Air Valves shall be automatic (Fig. 190, nickel plated (Fig. 191, with [illegible] Fig. [illegible] of air in large [illegible] return air lines) are [illegible]
9. Steam Trap, to remove [illegible] of steam, shall be Fig. [illegible]
All valves shall be genuine JENKINS, bearing the name "JENKINS" within a diamond mark.
PLUMBING
VALVES
1. All valves shall be genuine JENKINS, bearing the name "JENKINS" within a diamond mark. Numbers designating valves refer to the same [illegible]
2. All valves shall be fully equal in area to the opening of the pipe on which they are located.
3. All valves for hot or cold water service, except gate valves, shall be fitted with JENKINS discs, No. 110 discs for hot water, No. 93 for cold.
FOR WATER SUPPLY SYSTEMS
4. Globe Valves shall be (Fig. 106, brass, screwed, for 250-lb. working pressure; Fig. 107, same, flanged; Fig. 141, iron body with yoke, composition mounted, screwed, for 250-lb. working pressure; Fig. 142, same flanged).
5. Angle Valves shall be (Fig. 108, brass, screwed for 250-lb. working pressure; Fig. 109, same, flanged; Fig. 143, iron body, composition mounted, with yoke, screwed; for 250-lb. working pressure; Fig. 144, same flanged).
6. Cross Valves shall be (Fig. 110, brass, screwed for 250-lb. working pressure; Fig. 111, same, flanged; Fig. 145, iron body, composition mounted, with yoke, screwed, for 250-lb. working pressure; Fig. 146, same flanged).
7. Check Valves shall be Fig. 358 brass swing check valves, screwed, or Fig. 353, same flanged for 150 pounds working pressure; Fig. 294, iron body screwed, or Fig. 295, iron body, flanged.
8. Gate Valves shall be (Fig. 370, brass standard, pattern, screwed, inside screw, for 175-lb. working pressure; Fig. 371, same flanged; Fig. 368, brass standard, pattern, screwed, outside screw and yoke; Fig. 369, same, flanged; Fig. 325, iron body, standard pattern; screwed, inside screw, for 175-lb. working

In Specifying Jenkins Valves—

we offer the suggestion that specifications be made to read as follows: "All Valves shall be genuine Jenkins, bearing the name 'JENKINS' within a diamond mark."

This protects against the substitution of inferior valves frequently called "Jenkins type" or "Jenkins this" or "Jenkins that."

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Jenkins Valves are made in types and sizes to meet all requirements. Their everlasting dependability is due chiefly to the fact that each valve is made for the maximum service in the use for which it is recommended, not merely the average.

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Factory Hospital Equipment

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NOVELTY SMOKELESS BOILERS

The Boiler with the Carburetor

Who Pays for the Smoke Nuisance?

Property owners pay for it in depreciation of property—the people pay for it in a lowering of health averages. That is borne out by the rigid enforcement of smoke ordinances.

Then, too, the smoke that pours out of the chimney is an advertisement of waste. It is just as much waste as though you carried 40% of your coal pile to a river bank and dumped it over.

In the NOVELTY Smokeless Boiler smoke and soot, by the admixture of air in proper proportion, become fuel and is burned, producing a heat of greater intensity than that of burning coal.

In the NOVELTY Smokeless Boiler the coal is more thoroughly burned—fewer firing periods and either hard or soft coal may be used. Depreciation is reduced because the elements causing depreciation become fuel.

By all means write for complete circular describing this unusual boiler. It will point the way to more and cheaper heat.

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Makers of Novelty Heating and Cooking Apparatus for 73 years

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THE DISTINGUISHED SERVICE LINE

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In tests made by the Pittsburgh Testing Laboratories the

MONARCH DOWN-DRAFT SMOKELESS BOILER

Showed the highest efficiency and economy

APPROVED IN CITIES WHERE ANTI-SMOKE ORDINANCES ARE IN FORCE

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By installing a Monarch Down-Draft Boiler that will burn any soft coal "smokelessly" you are guaranteed immunity from Smoke Ordinances and a saving in your coal bill of from 25 to 33⅓ per cent.

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The Wm. H. Page Boiler Co.

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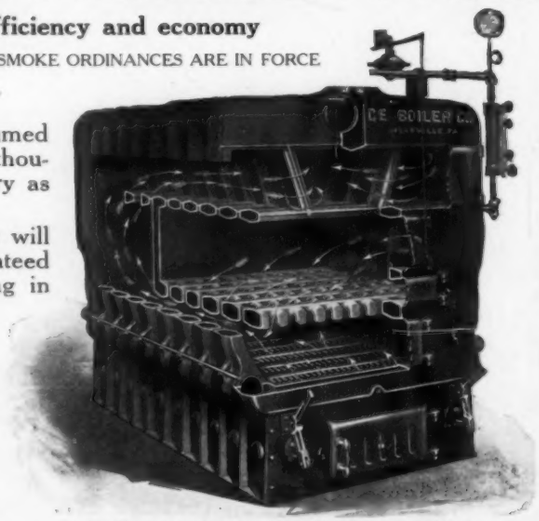
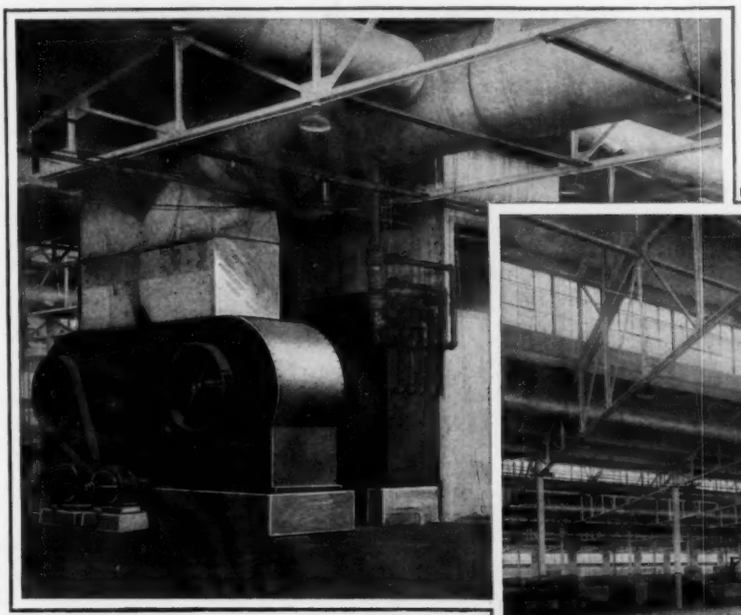
Makers of a complete line of Round and Square Boilers for every class of building

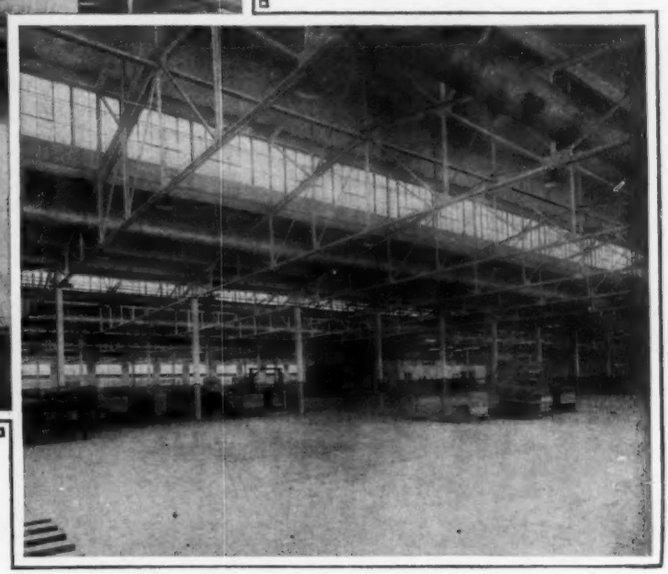


MONARCH DOWN-DRAFT SMOKELESS BOILER

CLARAGE
KALAMAZOO



Architects and Engineers: Billingham & Cobb, Kalamazoo, Mich.



Clarage Heating and Ventilating Equipment in the New Paper Box Mill of the Eddy Paper Co., Three Rivers, Mich.

Warm Air in Winter — Cool in Summer

Modern Business heartily endorses proper heating and ventilation. Industry has learned through experience that fresh, pure air correctly temperatured, makes for greater production — more efficient workers.

The Architects and Engineers for this new mill specified and recommended Clarage Equipment. They were certain that Clarage Apparatus would prove most satisfactory to their client. The equipment installed guarantees to every worker, in any part of the plant, an abundance of good, fresh air from out-of-doors; warmed in winter — cool in summer.

Clarage Engineers will gladly co-operate with you in solving your heating and ventilation problems. A Clarage System is adaptable for offices, public buildings and industrial plants — old buildings as well as new.

Catalog A-51 describes our Multiblade Fans for Heating and Ventilation. Write for your copy to-day!

See Sweet's Catalog for brief discussions on Clarage Products.

CLARAGE FAN COMPANY

North Street, Kalamazoo, Michigan

Engineering and Sales Offices in Principal Cities

Manufacturers of Fans, Blowers, Heaters, Engines, Etc.

Do You Throw Away a Faucet When the Washer is Worn Out?

Of course you don't—you simply put in a new washer costing but a few cents.

It is the same with a Pratt & Cady Renewable Asbestos Disc Globe Valve. When the disc wears out you simply put in a new one at about 10 per cent of the price of an entire new valve.

That saves buying a new valve, also the time and cost of tearing the valve out of the line. Without removing a P. & C. Renewable Valve from the pipe line, a new disc can be inserted in a few minutes.

Try a few Pratt & Cady Renewable Disc Globe or Renewable Seat Gate Valves and prove to yourself that they will reduce your valve maintenance cost to a mere fraction of your present cost.

Made in Iron and Bronze in all standard sizes for every service.

Write for Valve Book to-day

PRATT & CADY CO., INC.

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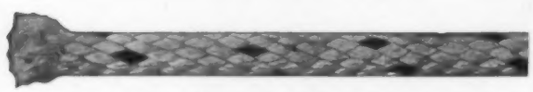
Representatives in All Large Cities

Pratt & Cady
Renewable Disc GLOBE VALVES

Samson Spot Sash Cord



"Spot it by the Spots"

Spot Cord is made of extra quality stock, is carefully inspected and is guaranteed free from the imperfections of braid and finish which make common sash cord wear out so quickly.

It can be distinguished at a glance by our trade mark, the Colored Spots, used only with this quality.

Send for catalogue and sample card

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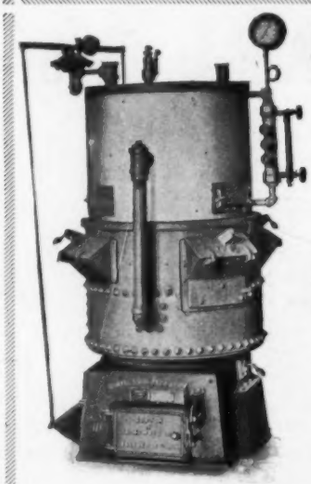
Boston, Mass.



Durability

of the **Gorton Self-Feeding Boiler** is demonstrated by the fact that many of the boilers installed over 25 years ago are still in use giving entire satisfaction.

Efficiency

The **Gorton Self-Feeding Boilers** are built on the lines of Power Boilers, using the same material, thus securing the greatest Strength, Durability, and highest Efficiency.

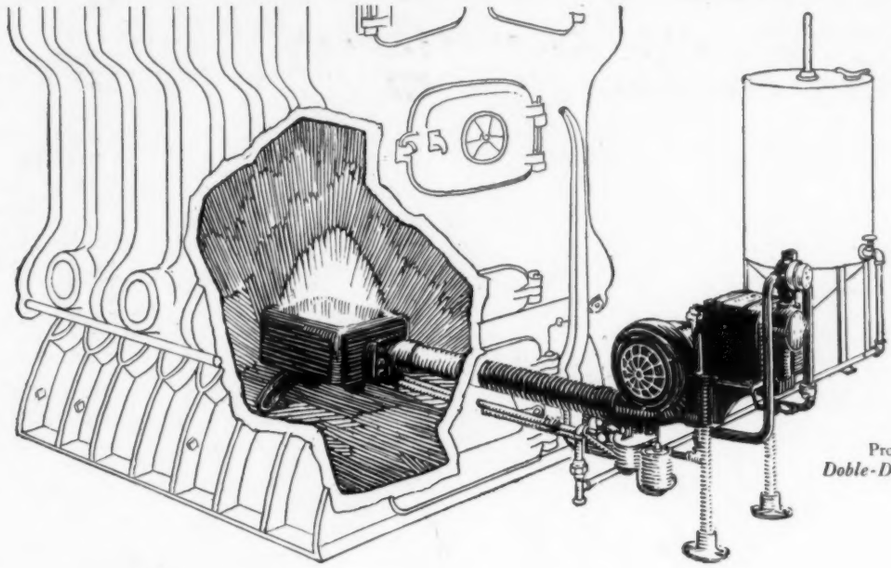
The **Gorton Self-Feeding Boiler** gives a steady heat with attention only morning and night; its construction insures complete combustion of the gases and prevents the waste of coal.

See pages 2, 3, 4, 6, 8, 10, 11, and 13 of Catalog No. 88.

OUR NEW NO. 88 CATALOG IS READY—WILL BE SENT UPON REQUEST

Gorton & Lidgerwood Co.
96 Liberty Street, New York

All Gorton Self-Feeding Boilers built to the "A. S. M. E. Standard"



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When you know the facts you'll specify Nokol for heating homes

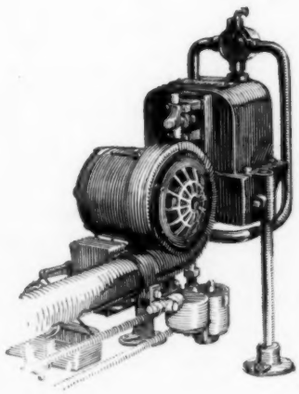
HERE'S a successful, efficient oil-burning device for heating a house. It can be installed in almost any furnace, or heating plant; it does away entirely with all the dirt of coal and ashes. It works by thermostat control, automatically. It keeps a house at an even temperature day and night.

Nokol gives as much heat from 100 gallons of oil as can be got from a ton of anthracite coal.

This device has been in use for some years, very successfully.

For the comfort of uniform temperature, for cleanliness and absence of coal dirt, for simplicity and convenience of operation, it's the greatest step forward since the advent of steam and hot water plants.

Price, $325, f. o. b. Chicago; tank prices in proportion to size



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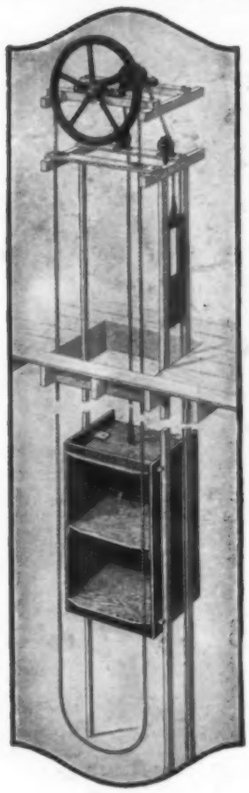
Nokol
automatic oil heater

THE STEAM CORPORATION
Division of Amalgamated Machinery Corporation
209-215 N. MICHIGAN AVE., CHICAGO, ILL.



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One Quality

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Hand Power Elevators and Dumb Waiters

It is safe practice for the architect to always specify Sedgwick Outfits, thus insuring the highest quality.

If you are in doubt as to the type which will give best results, do not hesitate to consult us.

Our Service Sheet is free. It includes much condensed information for architects, also specification forms.

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Specialists for twenty-five years

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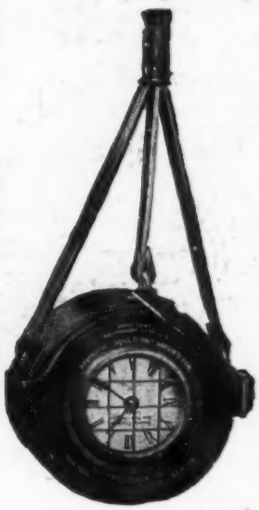

The National Biscuit Co. recognized the need for reliable Watch - clocks to protect their various plants from the fire and accident hazard.

Then they standardized on

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WATCH-CLOCKS

"A Positive Check on Human Fallibility"

In the buildings of your clients is it not just as essential that you take the same measure of precaution against burglary and destruction by fire, which these dependable Watch-clocks afford?

Ask us for booklet and sample specification sheet

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Manufacturers of Reliable Watchman's Clocks for Nearly 50 Years

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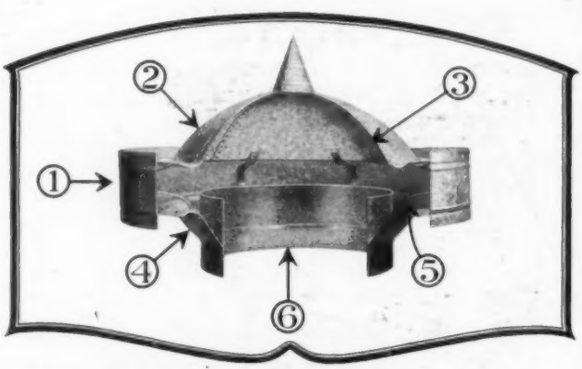


The tendency of heated air to rise is the basic principle of many ventilators. *But*—an efficient ventilator must *protect* and *accelerate* the rising air, and *prevent* the entrance of rain or snow.

Note the Dome (2) that deflects every outside air current thus creating air exhaust in the Outlet (6). The Storm Band (1) and the curved Bottom (4) prevent the invasion of cross or counter currents, thus *protecting* the upward flow of air, and also prevent snow or rain from entering the outlet.

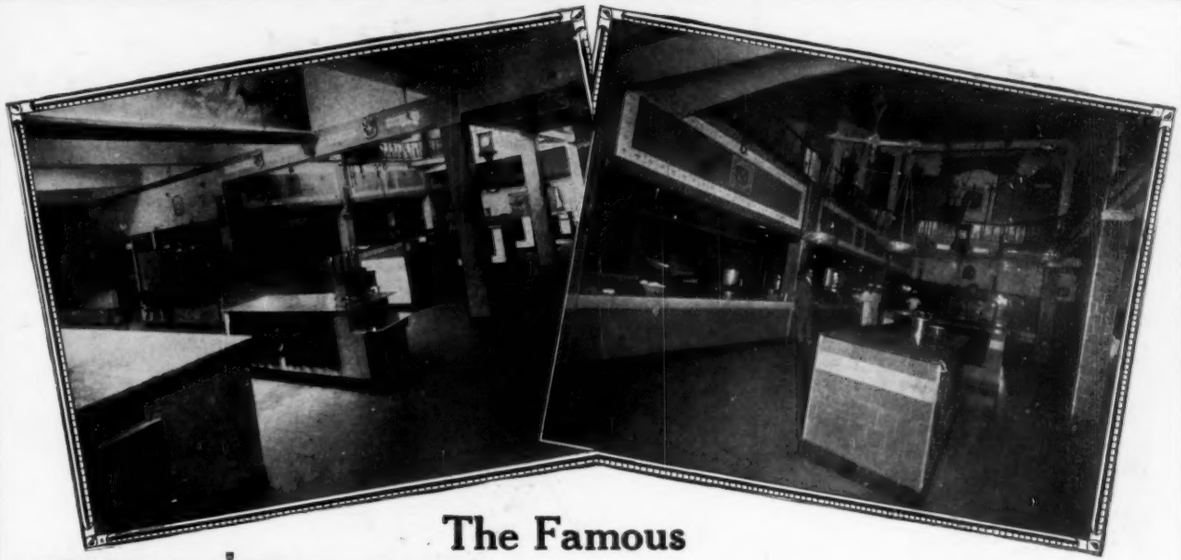
With this "GLOBE" construction EVERY air current, no matter how slight, MUST increase the flow of air and NO wind however strong CAN possibly interfere with the perfect operation of the ventilator.

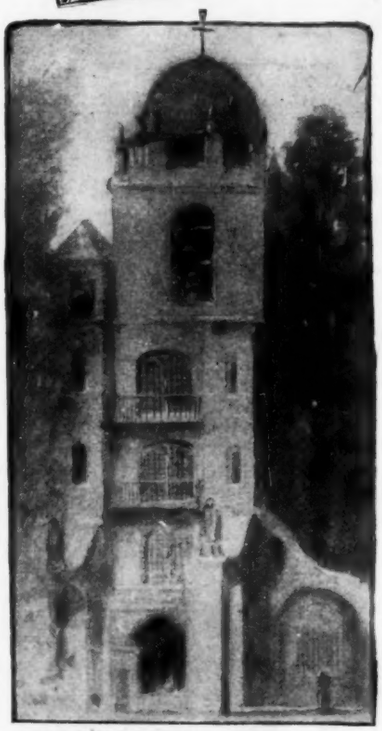
Overlapped and riveted seams (3) produce rigidity and added STRENGTH and the heavy galvanized iron braces (5) are designed to withstand unusual wind pressure. It would take a tornado to demolish a "GLOBE."

Send for FREE miniature working model that demonstrates the GLOBE principle. Please use your business stationery.

GLOBE VENTILATOR CO.

Department P TROY, N. Y.





The Famous

Mission Inn Riverside, Cal.

is equipped with

"Wear-Ever"

Aluminum Cooking Utensils

TOURISTS of lower California who visit this interesting inn with its quaint, old exterior reminiscent of days gone by are surprised by the immaculate appearance of its kitchens. These are thoroughly modern — tiled walls, floors and pillars testifying to the critical attention given by the management to cleanliness and wholesome atmosphere.

Because of the maintenance of so high a standard of sanitation by the Mission Inn, it is but natural that cleanly, seamless, silver-like **"Wear-Ever"** should be its cooking equipment.

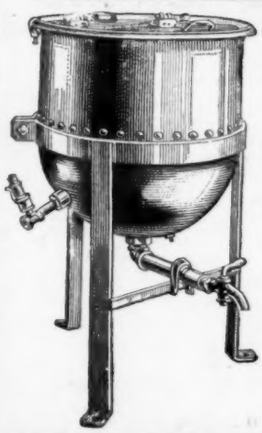
"Wear-Ever" utensils cannot rust, cannot flake, are pure and safe—*and never need tinning.*

Replace utensils that wear out with utensils that "Wear-Ever"

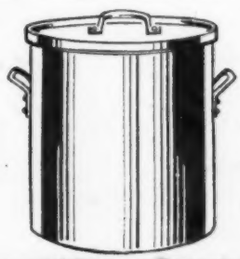
See Sweet's Architectural Catalog and the American Architects' Specification Manual for specification data on "Wear-Ever"

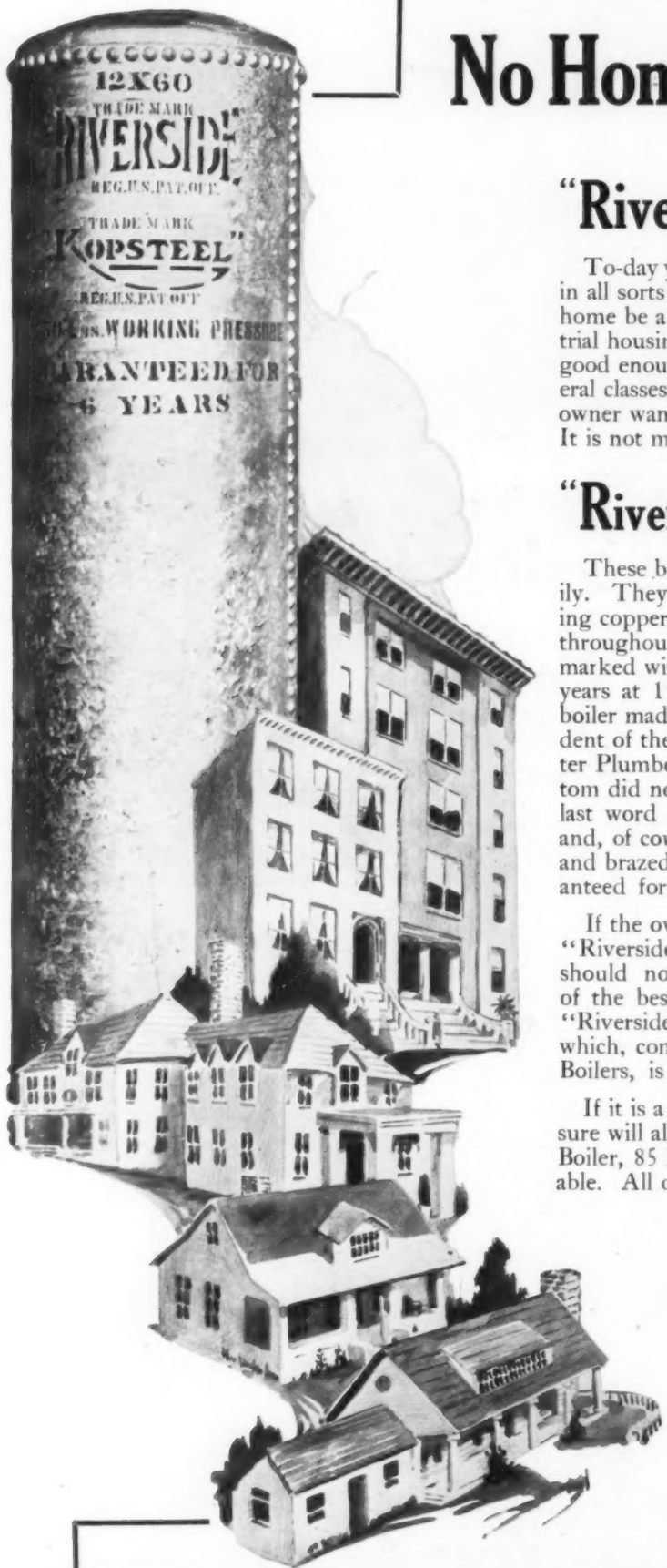
The Aluminum Cooking Utensil Co., New Kensington, Pa.

In Canada, "Wear-Ever" utensils are made by the Northern Aluminum Co., Limited, Toronto, Ont.



WEAR-EVER ALUMINUM TRADE MARK





No Home is Too Good

for the

"Riverside" Range Boiler

To-day you will find the "Riverside" Range Boiler in all sorts of homes. It matters not whether the home be a high class residence or one of an industrial housing proposition. The "Riverside" is made good enough for any and all uses. It is made in several classes, and it is purely a question of what the owner wants to pay. It has real Quality built into it. It is not merely a receptacle for water.

"Riverside" Kopsteel Boilers

These boilers are the best of the "Riverside" family. They are made of specially selected rust-resisting copper steel, and a double extra thickness is used throughout. Each boiler is tested to 300 lbs., but is marked with and carries a definite guarantee of six years at 150 lbs. working pressure. Tests of this boiler made under the supervision of a former President of the Massachusetts State Association of Master Plumbers showed that at 300 lbs. plus the bottom did not bulge a hair! This boiler represents the last word in galvanized range boiler construction, and, of course, like every "Riverside," it is riveted and brazed. Remember that it is marked and guaranteed for six years at 150 lbs. working pressure.

If the owner cannot afford the extra cost of the "Riverside Kopsteel" Boiler (which, by the way, should not cost more than one-half to one-third of the best copper boiler made), then specify the "Riverside" Extra Heavy, 150 lbs. working pressure, which, compared with other so-called Extra Heavy Boilers, is really a "Super-Extra Heavy" Boiler.

If it is a question of price entirely, and if the pressure will allow it, the "Riverside" Standard Range Boiler, 85 lbs. working pressure, will be found suitable. All of these boilers are Riveted and Brazed.

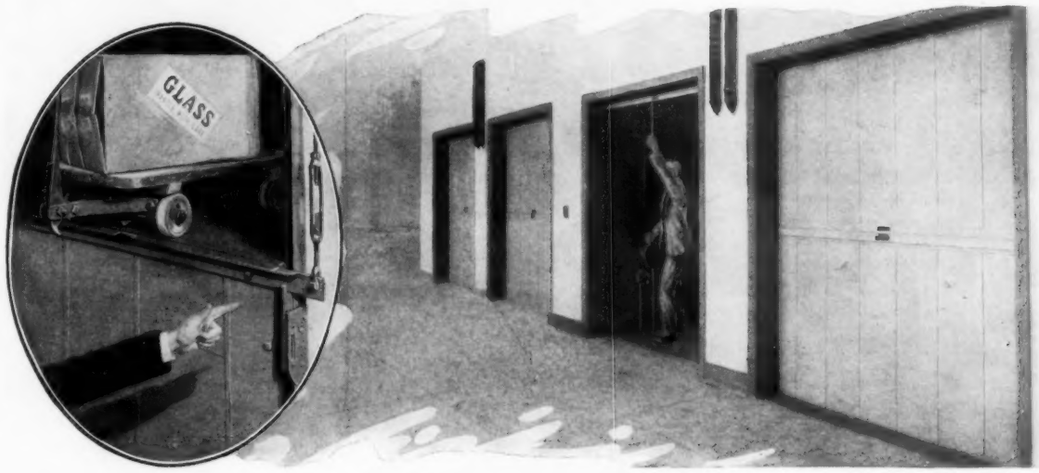
"Look us up in Sweet's"

RIVERSIDE BOILER WORKS, Inc.

The Quality Range Boiler Builders

Cambridge, Mass.

Put your Elevator Door Problems up to Peelle



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The Truckable Feature of PEELLE Doors is Exclusive!

THE wheels of heavy or light trucks pass smoothly and easily into or out of elevators where there are PEELLE Counterbalanced Freight Elevator Doors. This is due to the truckable feature of PEELLE Doors—a rigidly supported bar which perfectly bridges the gap between elevator and floor sill. And this *exclusive* PEELLE feature is one of the many which make PEELLE Doors supreme.

PEELLE Doors embody the most approved elevator door engineering practice. They are accident-proof, fire-proof, of life-long durability and are unobtrusive and space-saving. They are operated vertically by electricity or manually, and increase elevator efficiency to a marked degree.

Do not be misled by imitations termed "Peelle Type," "Peelle Style," etc. Write today for one of our engineers, without obligation, or for a copy of latest catalogue.

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FREIGHT ELEVATOR DOORS

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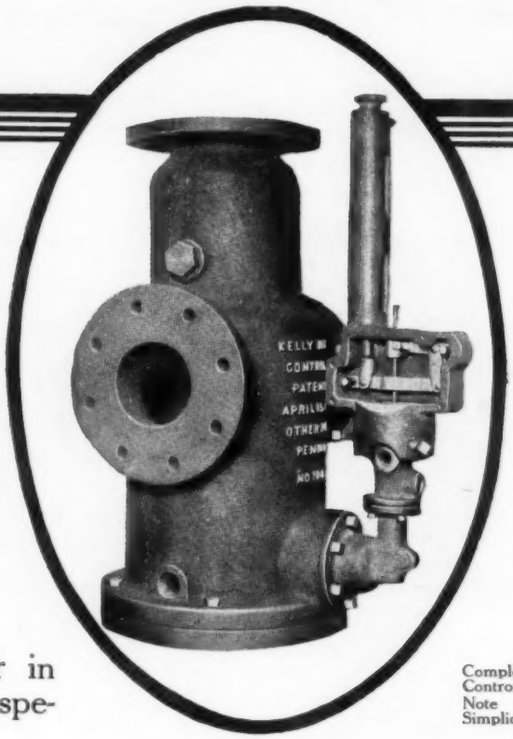
Peelle Products Protect

The Final Touch to the Heating System



Complete Controller Note Simplicity

YOU cannot specify a trained engineer in charge of heating boilers, but you *can* specify the device that will

Prevent Explosions and Cracked Sections

The Kelly Controller is the perfected result of years of effort to produce a simple, fool-proof device which will unfailingly and automatically correct every faulty condition that can develop in heating boilers—even when the heating system falls into the hands of the most unskilled operator.

It immediately meets impending dangers and forestalls accidents, restoring the boiler to normal operation.

When a slight surging condition occurs, the water which threatens to foam over into the system is deflected into the controller chamber and returned to the boiler through a bleeder pipe.

If ordinary steam separation is inadequate, an automatic water valve supplies the boiler with just enough feed water to reduce the temperature of the overheated surging water and correct the condition.

If, through carelessness or ignorance, the attendant continues to fire the overheated boiler, the controller goes a step farther and completely cuts off the boiler from the system, at the same time gradually reducing the water temperature. Since syphoning is impossible, explosions are absolutely prevented. Controller takes the place of the steam header and is just as easily installed.

Accorded the Fairbanks "O. K."

After rigid tests covering every condition that can arise in actual service, the Kelly Controller has received that well-known stamp of proven merit — The Fairbanks Company "O. K."

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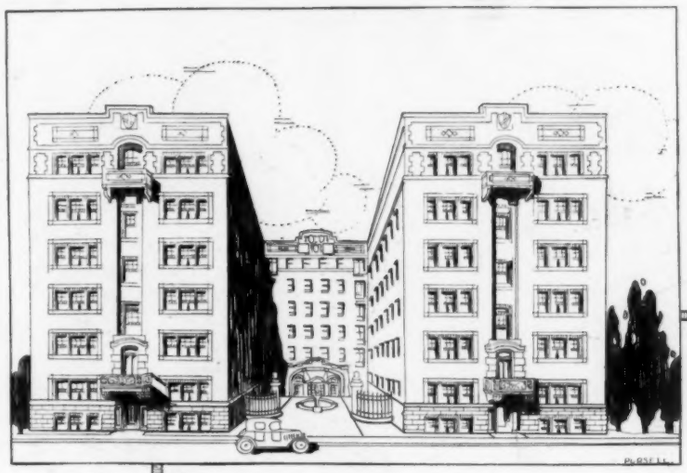
Kelly Controller
"The Boiler Master"



Buckingham Apartments, Minneapolis, A. Rose, Architect and Consulting Engineer. Erected by Fleisher Construction Company. 3 Kewanee Smokeless Boilers installed by Haas Plumbing & Heating Co.

KEWANEE

There are many reasons why you will find Kewanee Boilers heating the best buildings of all kinds in all parts of the country.

A Kewanee Smokeless Boiler burns any coal COMPLETELY. Complete combustion means NO WASTED FUEL and no smoke. That means the owner can burn any coal he can get without wasting any of it and without running foul of a smoke ordinance.

Kewanee Boilers are ALL STEEL—and steel for boiler building beats any other material. Get a Kewanee in a building and it is there to stay. Nothing to get out of order and repair costs are practically nothing.

These are some of the reasons you find Kewanee Boilers heating the best buildings.

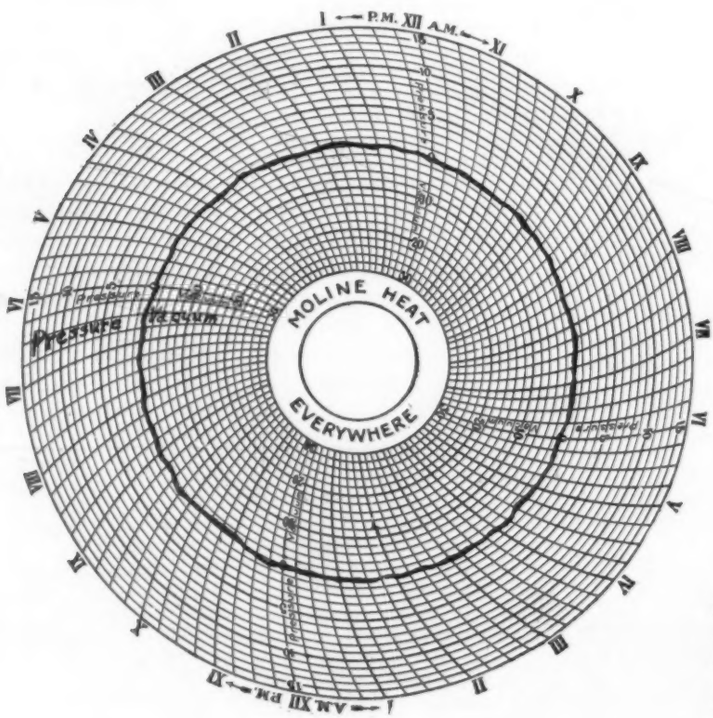
KEWANEE BOILER COMPANY
KEWANEE, ILLINOIS

Steel Heating Boilers, Radiators, Tanks
Water Heating Garbage Burners

Dr. O. H. Albanesius Apartments, Jersey City, N. J.

D. Hustace Simonson, Architect — **Davis & Van Woert, Heating Contractors**

Several hundred radiators in operation since 1913.
No vacuum pumps — not a single radiator trap — no repairs — yet operates on a few ounces pressure.



Simple
Durable
Dependable

Greater Shorter Colleges, Rome, Ga.
A. W. Van Hoose, President — Rome Supply Co., Htg. Contractors

This plant was installed in a little over thirty days from Moline Heat Construction Details. The most distant building is 1,000 feet from the boiler room. The plant is so simple that a single darky is the only attendant. Installed in 1910, and no call for repairs had yet been received in 1920.

WHY SADDLE REPAIR BILLS ON YOUR CLIENT?

It is no longer necessary

IT IS more apparent every day that the discriminating client — he who has had experience — desires a system of heating devoid of unnecessary apparatus. Hundreds of automatic devices make operation uncertain and increase maintenance cost.

King George School, Moose Jaw, Can.
Moose Jaw Hdwe. Co., Htg. Contractors
Moose Jaw, Canada

Moline Heat positively and noiselessly circulates steam through the most extensive plant at a pressure of a few ounces only. No automatic radiator traps required. Moline Heat equipment is simple and is applied where it will operate continuously — not at the return end of a radiator or coil where the dirt, oil and constantly accumulating sediment quickly make it inoperative.

Moline Heat does not furnish plans and specifications for competitive purposes, but, when you order Moline Heat, complete Construction Details are furnished for your approval to make sure that Moline Heat equipment will be installed properly and under proper conditions. That is your insurance — your client's insurance.

May we give you an estimate? Will you send us a set of your plans of any kind of a building from residence to factory?

Send for our catalogue. You will find some valuable data on heating and ventilating. Write Dept. C.

Moline **Illinois**

J. J. Moeb's Apartments, Washington, D. C.
C. L. Wenger, Heating Contractor

460 radiators on this plant with no automatic traps on them. Moline Heat does the work without any pumps to produce circulation.

Cleveland Museum of Art, Wade Park, Cleveland, O.
Hubbell & Benes, Architects Crowell-Lundoff-Little Co., Genl. Cont.

WATERPROOF THROUGHOUT

THAT is a very desirable thing to be able to say about any structure. It can be said with absolute certainty, however, when "R.I.W." Protective Products are used.

These materials are made for every type of material used in building—whether it's steel, wood or concrete—and for equipment. Two grades of

R.I.W. REMEMBER IT'S WATERPROOF REG. U.S. PAT. OFF. PROTECTIVE PRODUCTS

were selected by the architects of the Cleveland Museum of Art.

"R.I.W." TOXEMENT (pat'd) was used for waterproofing the concrete foundations. This integral waterproofing compound lubricates concrete, increases its workability, plasticity and flowability, renders it non-porous, and eliminates the necessity for extreme tamping and vertical chuting.

No. 110 "R.I.W." was applied to the five unexposed sides of all the cut stone work. This material is black, waterproof and protects the stone from the chemical action and discoloration due to the alkali in cement mortar.

For details write Dept. 97

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Technical and Scientific Paint Makers Since 1848
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Works: Long Island City, N. Y., and London, England

R.I.W.
REMEMBER IT'S WATERPROOF
STEEL NEED NOT RUST!
WOOD NEED NOT ROT!
NOR CONCRETE DUST!
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Olde Stonesfield Roofs

That time is past when roofs are considered simply as a weather protection. They are now given the same consistent care and thought in design and treatment, as the rest of the building.

Which fact is largely accountable for the latter day absence of bald effects and the resultant charm and interest so many roofs do now hold.

Inquiry will reveal the number of these which are Olde Stonesfield. Why they are called such and how the graduated variant effects are produced, we will be glad to tell you.

The John D. Emack Co.

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"CREO-DIPT" Stained Shingles

For a home exterior of infinite beauty and practicality, specify "Creo-Dipt" Stained Shingles which merit deepest approval also for their true first-cost and upkeep economy.

Each shingle is stained separately, uniformly and permanently one of 30 beautiful shades of red, brown, green, gray. Bundled ready to lay. Proof against dry-rot and weather.

For delightful suggestions, send today for Portfolio of Homes and Color Samples. Ask about "Creo-Dipt" Thatch Roofs; 24" Dixie White Side Walls.

Portfolio of Homes

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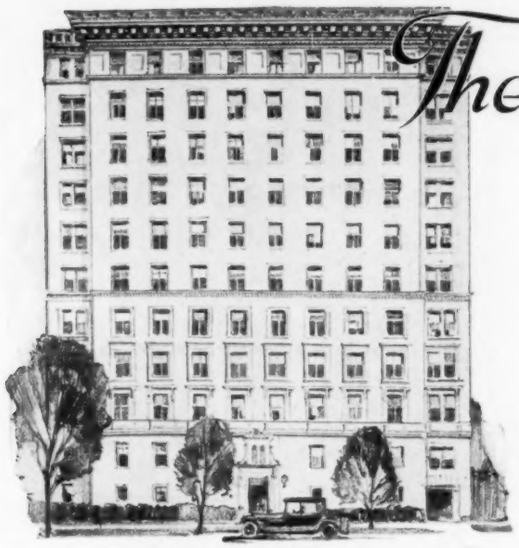
Home of B. L. Taylor
Glencoe, Ill., Arch.:
Robt. Seyfarth, Chicago

Detail of House by
Archts. Tooker & Marsh
New York City



Eckland, Fugard & Knapp, Architects
T. J. Douglas & Co., Heating Engineers

There Is No Fuel Problem in This Chicago Building

That question was settled at the outset, when the architects planned the heating system for the Shoreland Apartments, Lake Shore Drive. They provided for a battery of three Imperial Super-Smokeless Boilers.

In these boilers any fuel can be burned without smoke and with greatest efficiency. To the rear of the grate there is a Hot Blast Chamber, so designed that the gases and smoke distilled from the coal (which are usually lost up the chimney) are mixed with air, burned and their heat utilized.

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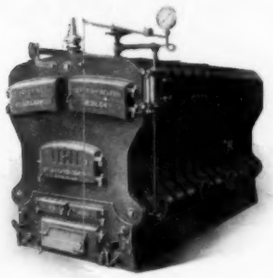

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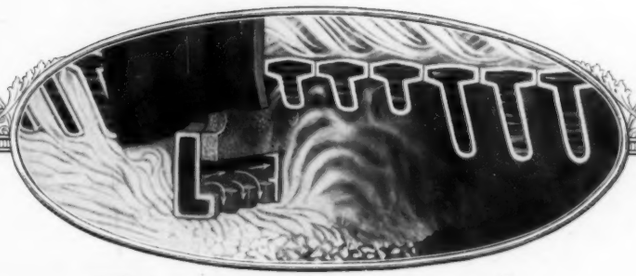

Imperial Super-Smokeless Boilers

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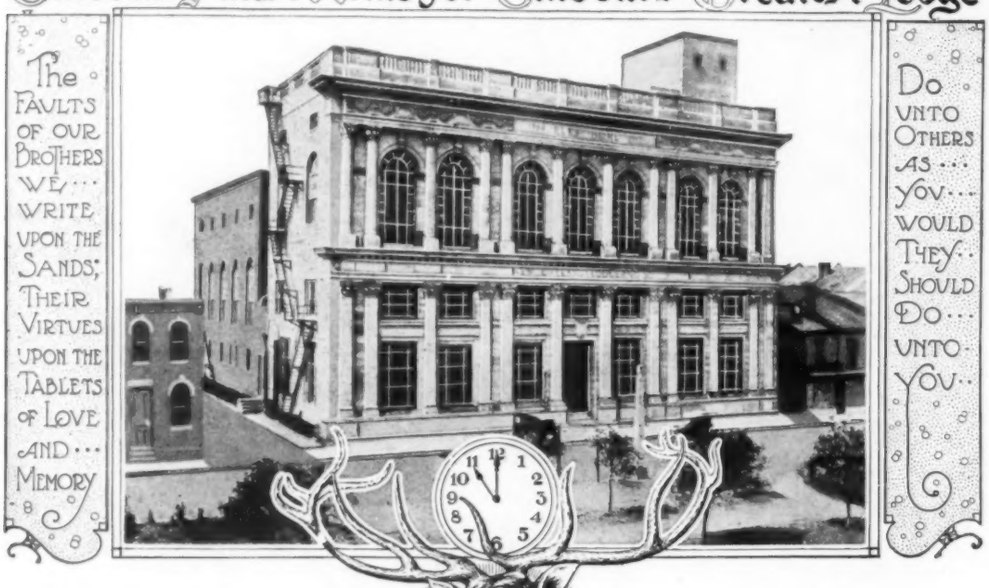
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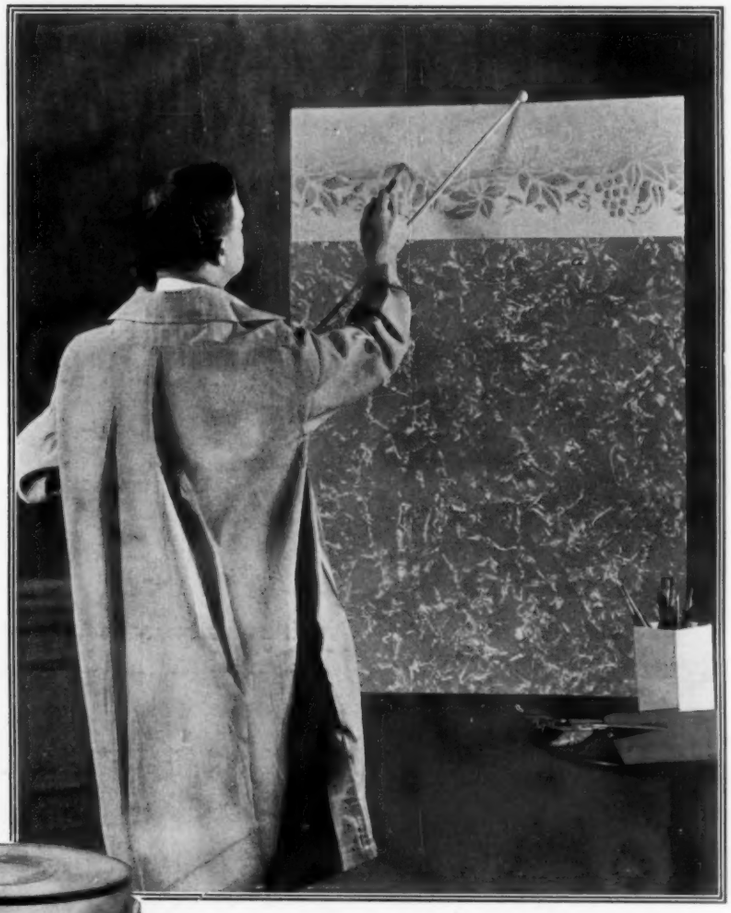

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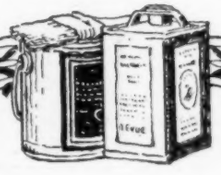

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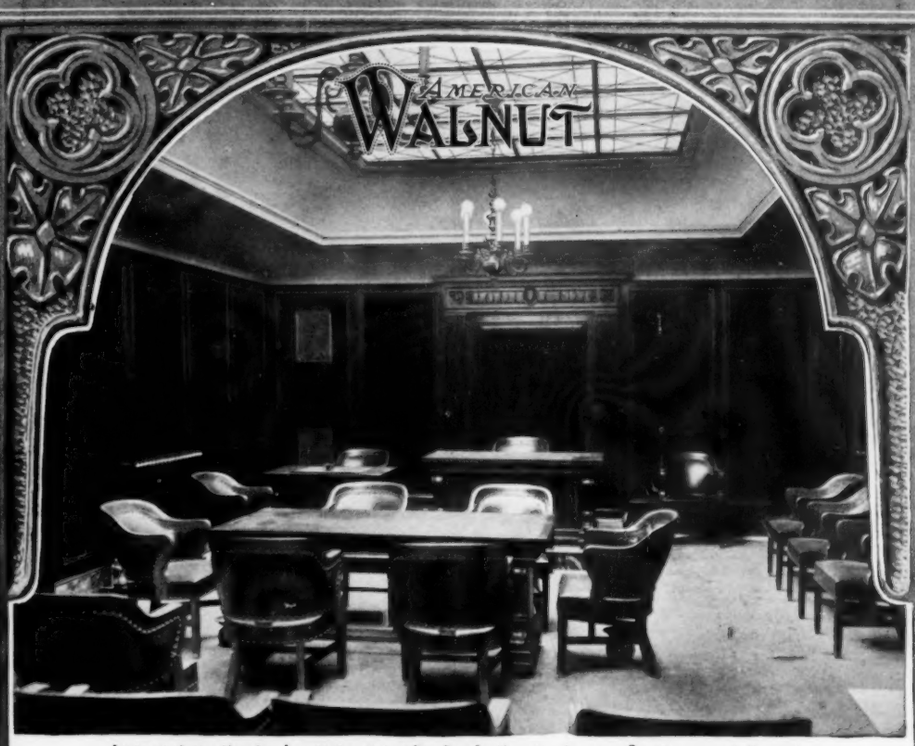

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American Walnut: Best Banks

THE finest traditions of banking, and of architecture, are comparable to the dignity of Walnut throughout the history of fine cabinet-work.

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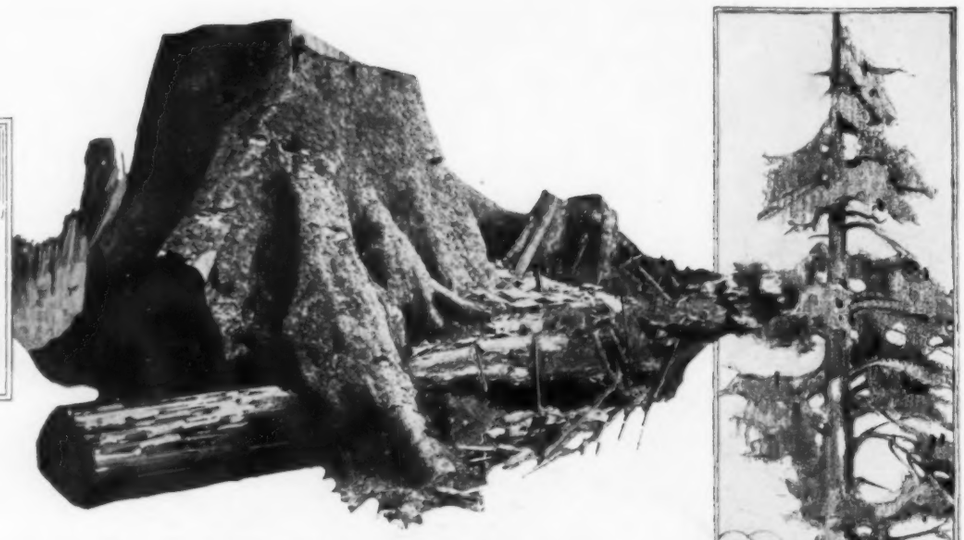

The Redwood log seen buried here was discovered while clearing a path for a railroad switch-back in Del Norte County, California. Part of the log was cut away, and although it was estimated that it had fallen six hundred years ago, the timber was perfectly sound—fit for merchantable lumber.

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California Redwood
Resists Fire and Rot

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Money can be saved, clients thoroughly satisfied and builders practically helped by the selection of

Arkansas Soft Pine

Satin-like Interior Trim

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Costing notably less than rarer woods, it has a definite non-resinous character and tough fibre, insuring against discoloration of white enamel, or raised grain under enamel or stain.

It is the perfect wood for casing, base and mouldings in houses of the better sort, where an exceptionally fine satin-like surface is desired.

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ANALYZE the functions of a bedroom floor. Then consider the inherent qualities of Armstrong's Cork Tile. You will perceive, quite clearly, a relationship that is intimate and real.

The very nature of a bedroom calls for a floor that is warm and pleasing to the touch, silent to walk on sanitary, and restful in appearance. Yet how many flooring materials meet *all* of these requirements in an entirely satisfactory manner?

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the modern wood preservative, gives new life to old or new wooden floors.

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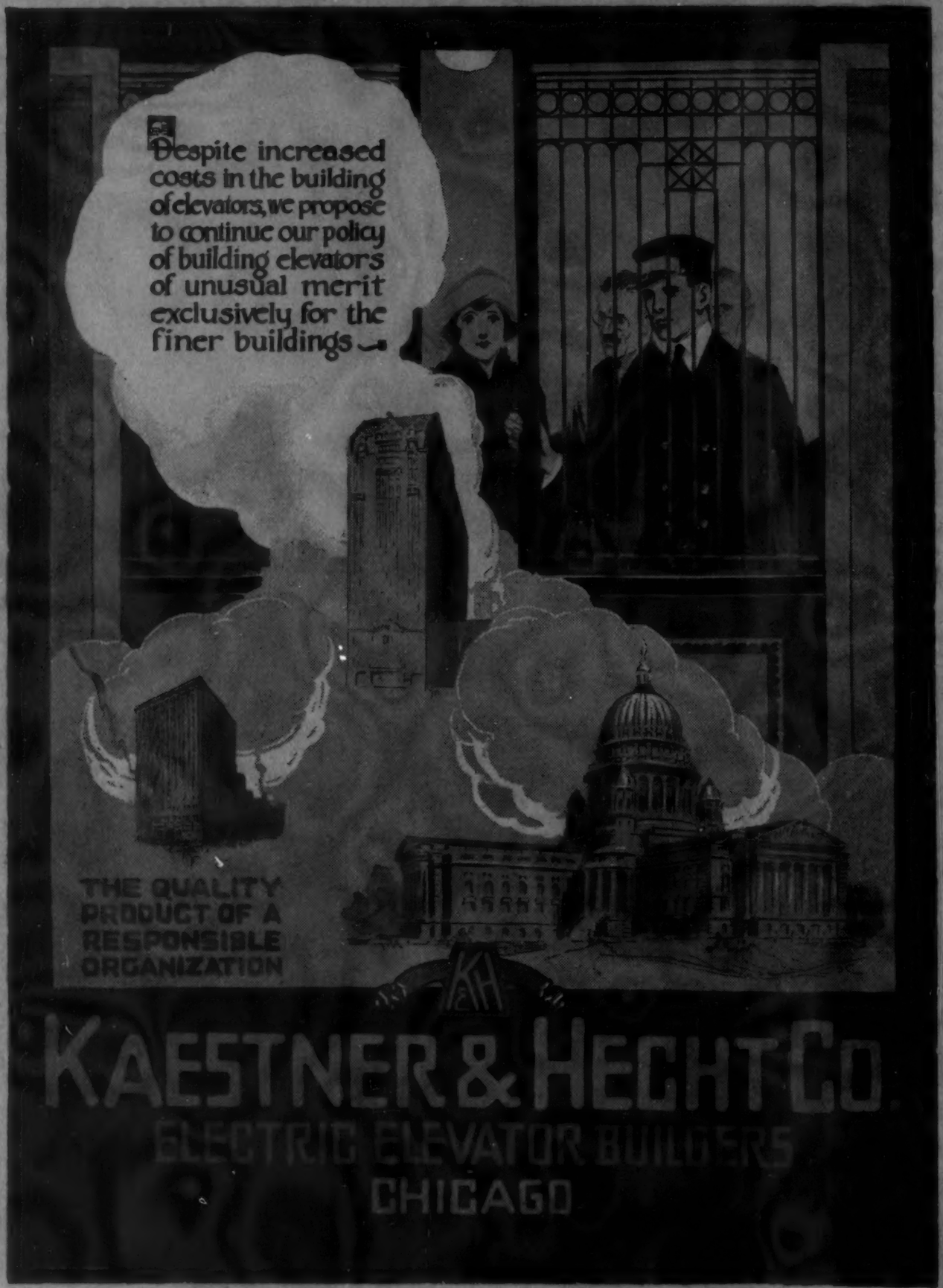
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